CHARACTERIZING AND EXPLORING DIFFERENCES IN PHARMACY STUDENTS' MOTIVATION AND MOTIVATION CO-CONSTRUCTION IN COLLABORATIVE LEARNING

Kayley M. Lyons

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Approved by:

Jacqueline E. McLaughlin

Jeffrey A. Greene

Sharon J. Derry

Kelly Ryoo

Tina P. Brock

ABSTRACT

Kayley M. Lyons: Characterizing and Exploring Differences in Pharmacy Students' Motivation and Motivation Co-Construction in Collaborative Learning
(Under the direction of Jacqueline E. McLaughlin)

The purpose of this study was to characterize types of motivation and motivation co-construction during collaborative learning, as well as explore differences in motivation between two extreme cases of student project groups. In an entrepreneurship course, six groups of four to five pharmacy students worked on a collaborative project to solve a variety of authentic ill-defined health care problems. I selected two student project groups; a group in which all members rated their motivation high throughout the group project and a group in which most members rated their motivation average to start and low at the end of the semester. The data analysis included semester-long video observations paired with weekly surveys of students' perceptions. I conducted a directed content analysis of transcribed student statements for the occurrence of several types of motivational states, beliefs, values, goals, and behavioral expressions. I coded each instance that students expressed a motivation construct for co-construction mechanisms. The specific co-construction mechanisms determined the level of the motivation construct (e.g., group-level). Also, the students' co-construction of motivation constructs could follow either a negotiation or motivation regulation pathway.

The key assertion of the study was that differences in students' motivation during collaborative learning can be explained by achievement motivation theories but with the added complexity of socio-motivational dynamics. These socio-motivational dynamics included: 1) the co-construction of motivational beliefs, values, and goals, 2) students' beliefs and values about

themselves, their peers, and the group, 3) similarities and differences between group member's motives, achievement goal orientations, social goal orientations, and standards, 4) negotiation and regulation of motivational beliefs, values, goals, states, and behavioral expressions, 5) students' impression management and psychological safety.

The resulting codebook, organizing framework, and the inventory of the types of motivational beliefs, values, and goals will enable future researchers to further disentangle the complexity of motivation in collaborative learning groups. This study contributes to research about the fundamental knowledge and theory of collaborative learning groups' motivational and social processes.

This work is dedicated to current and future pharmacy students, especially those who participated in this study, and their future patients.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

CSCL	Computer-Supported Collaborative Learning
Co-RL	Co-Regulated Learning
DBR	Design-Based Research
PBL	Problem-Based Learning
SRL	Self-Regulated Learning
SSRL	Socially-Shared Regulated Learning
TBL	Team-Based Learning

CHAPTER 1: INTRODUCTION

Health care professionals must increasingly work in teams to provide patient care and implement health care system improvements (Berwick & Finkelstein, 2010). As the number of treatments and diagnoses exponentially increase, it is imperative that health professionals can work together and utilize each other's diverse expertise. Currently, patient care teams and health care improvement teams report many collaboration challenges. In practice, healthcare teams often fail to achieve smooth coordination, equal participation, and balanced power (Freeth, 2001; Schaik, O'brien, Almeida, & Adler, 2014). Team members report difficulty with aligning goals, sharing power, communication, and superficially mundane matters such as scheduling meetings, practical communication, and reporting (Freeth, 2001). Poor teamwork affects patient care (Kripalani et al., 2007), safety (Kripalani et al., 2007), and communication (Alvarez & Coiera, 2006) whereas dysfunctions in health care quality improvement teams limit much needed progress in the health care system.

Many educators have called on health professions schools to teach collaboration skills to increase the effectiveness and efficiency of teams in health care (Berwick & Finkelstein, 2010; Irby, Cooke, & O'Brien, 2010). In response, health professions schools and accreditation bodies now emphasize the need to develop students' collaboration skills (Irby et al., 2010). This movement has also followed a wider education campaign to teach collaboration skills as a necessary 21st century skill (Trilling & Fadel, 2009). To teach collaboration skills, health professions schools are bolstering traditional group learning models such as problem-based learning (PBL) (Barrows & Tamblyn, 1980) and implementing new models such as team-based

learning (TBL) (Michaelsen, Sweet, & Parmelee, 2011), interprofessional education (Reeves et al., 2008), and group improvement projects (Berwick & Finkelstein, 2010). Educators have assumed that by using these models, students will instinctively develop collaboration skills as a byproduct of engaging in team-based activities (Michaelsen et al., 2011).

Health professions schools increasingly use group learning to not only practice collaboration skills, but also to foster deeper thinking and learning. When students engage in collaborative learning, they are prompted to elaborate on their thinking and receive feedback from other students (Dillenbourg, 1999). Building arguments with other students should strengthen ideas, make new connections for the material, and ultimately lead to long term retainment. Also, given that most practicing health professionals work in groups and teams, group learning should be closer to the real-world environment, thereby decreasing the gap for students between school learning and job performance.

Theoretically, group learning should foster collaboration skills and provide deep learning outcomes, but the empirical evidence is mixed. For example, in studies comparing group learning to traditional instruction methods (e.g., lectures), researchers found that group learning, in general, leads to similar outcomes for knowledge acquisition and conceptual understanding, but group learning is superior for knowledge application and understanding principles behind the concepts (Dochy, Segers, Van den Bossche, & Gijbels, 2003; Gijbels, Dochy, Van den Bossche, & Segers, 2005). Also, in medical education, a meta-analysis of research for one type of group learning, PBL, revealed that PBL was superior to traditional curricula for developing students' clinical skills and performance (Vernon & Blake, 1993). Several health sciences researchers have asked the question, "Does group learning improve learning outcomes?" (Fatmi, Hartling, Hillier, Campbell, & Oswald, 2013; River, Currie, Crawford, Betihavas, & Randall, 2016; Sisk, 2011)

These systematic reviews revealed that knowledge outcomes were mixed; some studies had positive outcomes for group learning, whereas others did not show a significant difference compared to individual learning. In addition, these review papers revealed mixed learner satisfaction. Some health professions students valued group learning, compared to others who reported that they would rather attend lectures or work on their own than collaborate with their peers (Bick et al., 2009; Espey, 2010; Houlden, Collier, Frid, John, & Pross, 2001).

Overall, the mixed empirical findings are not surprising as the variability between students' group learning experiences can be vast and dependent upon student factors, group formation, the group task, and educators. Particularly, researchers and students have pointed to common social and motivational dynamics that interrupt deep learning practices and progression in students' collaboration skills (Houlden et al., 2001; Tipping, Freeman, & Rachlis, 1995). For instance, many health professions student groups rush to find the right answer with the goal of receiving a high mark and finishing early (Hendry, Ryan, & Harris, 2003; Houlden et al., 2001) instead of using deep learning processes with the goal of learning the material. Within health professions student groups, motivation can be imbalanced due to well-described "social loafers," "free riders," "coasters," or "non-attendees" (Edmunds & Brown, 2010; Houlden et al., 2001; Tipping et al., 1995). These non-participating students do not complete their equal share of the work, nor are they as cognitively engaged as the rest of their group. Non-participating students lack motivation from the beginning of the task because they claim that group learning takes too much time or is too much work (De Grave, Dolmans, & Van Der Vleuten, 2002; Houlden et al., 2001). Also, group conflicts are commonly described in group learning, especially between "dominant," "aggressive," or "know-it-all" students and "passive" or "silent" students (Edmunds & Brown, 2010; Houlden et al., 2001; Virtanen, Kosunen, Holmberg-Marttila, & Virjo, 1999).

Motivational and social tensions in group learning may affect students' development of collaboration skills, perceptions of teamwork, and learning outcomes (Kempler Rogat, Linnenbrink-Garcia, & DiDonato, 2013). As a result, motivational and social tensions in group learning may impede health professional students' future ability to perform in health care teams. Therefore, student motivation in collaborative learning is a critical component of group learning. Students are unlikely to engage in deep learning processes and collaboration practices without motivation (Howe et al., 2007; S. Veenman, Denessen, van den Akker, & Van Der Rijt, 2005).

As students' motivation appears to be a variable and crucial aspect of group learning, researchers should uncover how and why this occurs. Specifically, the field would benefit from the understanding of how different types of motivation constructs emerge and occur in group learning. For example, does student motivation in groups vary because individual students value the task differently? What types of strategies do students use to overcome social and motivational tensions? Answers to questions such as these would improve the understanding of motivation in collaborative learning.

Motivation in Collaborative Learning

In comparison to cognitive factors (e.g., questioning, knowledge building), motivation is an underexplored domain in collaborative learning research (Järvelä & Järvenoja, 2011; Kempler Rogat et al., 2013). Motivation is a broad concept that is defined and positioned according to the researcher's theoretical perspective. Motivation research was once dominated by the behaviorist's perspective on motivation that included an emphasis on rewards and punishments. Now, a cognitive perspective dominates student motivation research. Cognitive motivation theorists focus on motivation beliefs and cognitions including self-efficacy, goal orientation, and causal attributions as important precursors, mediators, and outcomes of student learning

(Zimmerman & Schunk, 2008b). Cognitive motivation theorists have defined motivation as the emergence, influence, and maintenance of goal-orientated behavior (Wigfield et al., 2015) and measure the construct as a set of relatively stable motivational beliefs and cognitions (e.g, motives, attributions). When students want to learn and are confident in their abilities, they are more likely to put forth effort and persist in the learning process.

An emerging perspective, the situative motivation perspective, extended beyond the cognitive perspective to also include social interactions as motivation. Specifically, situative theorists included participation and the taking up of valued cultural practices in their definition of motivation. Situative theorists focus more on how context and social environment affords and constrains student cognitions. In research on individuals' motivation, situative motivation researchers have most frequently focused on student identity and engagement as central to student motivation (S. B. Nolen, Horn, & Ward, 2015).

Both cognitive and situative theorists have investigated how qualities of the context affect student motivation. What has emerged is the significance of *students' appraisals;* categorizations of people, events, and objects based on their defining features (Boekaerts & Minnaert, 1999). Students appraise their learning context based on their knowledge and experience of optimal and suboptimal context features and motivational beliefs (Boekaerts & Minnaert, 1999). Not all types of student appraisals affect student motivation and engagement to the same extent. Students' appraisal of the task, specifically the perceived difficulty (Paris, Byrnes, & Paris, 2001) and value (Wigfield, Rozenzweig, & Eccles, 2017), are especially important determinants of student engagement. In addition to task appraisals, students appraise their educators (Juvonen, 2006) and their peers (Juvonen & Knifsend, 2016), which may further affect their engagement.

In addition to group motivation processes, group *motivation regulation* processes are an

underexplored domain with potential insights into group motivation dynamics. Wolters (2003) defined motivation regulation as activities that students enact to intentionally start, maintain, or supplement their motivation to activate, sustain, or complete a particular activity or goal. Group motivation regulation may emerge whenever there is a challenge to the groups' motivation or engagement. Challenges may include low interest in the topic, unequal motivation amongst the group, or motivational beliefs that are interfering with the task. When a motivation challenge occurs, students may create a learning intention (e.g., "let's be efficient"), observe their motivational beliefs or states, evaluate their motivational beliefs or states, or intentionally enact a motivation regulation strategy (Boekaerts, 1996; Wolters & Benzon, 2013). Motivation regulation strategies are procedures students purposefully use to influence their motivation. For example, a student may suggest that the group should go out for ice cream if they finish the task early. In general, motivation regulation may occur at either the individual, peer, or group level. In other words, students may regulate their own, other's, or the group's motivation. When it occurs on a group level, students share and negotiate their individual motivational beliefs, thoughts, and behaviors to create group motivational beliefs, thoughts, and behaviors (Hadwin, Järvelä, & Miller, 2011).

Compared to research on individual students' motivation, researchers have conducted limited research on how motivation occurs in group learning. Rogat and colleagues (2013) recently reviewed studies of motivation in the group learning context and concluded that even these researchers often focused on individual-level motivation or that researchers positioned motivation secondary to cognitive factors. Also, group motivation researchers have investigated how certain program features promote motivation, but not how the students interact with those features or each other to promote motivation. The authors strongly advocated for future

researchers to examine how shared, *group level* motivation relates to productive group engagement and how this develops throughout time (Kempler Rogat et al., 2013).

In addition, previous researchers have focused on one target or a sub-target of a motivation construct; either motivation regulation, a motivational belief construct (e.g., efficacy) or a type of student appraisal. There is evidence that many of these motivation targets affect student learning (Hijzen, Boekaerts, & Vedder, 2007), group performance (Wentzel & Wigfield, 1998), or engagement. However, it is unknown how these factors co-emerge and co-occur as part of group dynamics. By using several motivation constructs, researchers may provide a more comprehensive examination of how and why students engage and become motivated in group learning. The underlying mechanisms and causes behind motivation and engagement are vast. Highly motivated groups may be motivated because of their task perceptions, emotions, interest, goal orientations, regulation processes, attributions, or more. Group motivation is probably due to varying combinations of these constructs, but researchers have not yet utilized them all to identify the most salient differences between collaborative learning groups. Using multiple theories provides a deeper, broader analysis and decreases alternative hypotheses for why phenomenon occurred (Banik, 1993; Lewis & Grimes, 1999).

Focus and Purpose of Study

The purpose of this study was to explore how student project groups co-constructed and differed in their motivation and motivation regulation processes. I achieved this aim through a comparative extreme case method (Patton, 2015) involving qualitatively analyzing videos of two student groups, one group in which all members rated their motivation high throughout the semester and another in which members ended with low ratings of their motivation. By observing moment-by-moment interactions between students, I identified how motivation

processes manifested in student behavior and statements. I use the word "manifest" to contrast this study with studies that solely used motivation belief inventories or retrospective interviews to focus on underlying student beliefs and hidden thoughts. Inventories and retrospective interviews are also important, but they are limited by social desirability and recall bias. Students may provide answers on inventories or interviews that are socially desirable but not accurate (Duckworth & Yeager, 2015). Also, students may forget the reasoning behind their actions or statements. Through my approach, I was able to watch and re-watch how motivational beliefs and regulation unfolded throughout time without relying on students' recall. Most importantly, video observation allowed for the study of how the students interacted with one another over time.

In this study, I utilized multiple motivation and regulation theories that were complementary to each other and did not overlap. As outlined in Chapter 2, I describe theoretical constructs under four targets: 1) motivational beliefs and cognitions (e.g., achievement goal orientation), 2) group behavioral engagement, 3) student appraisals of context features that affects motivation and engagement (e.g., task difficulty), and 4) motivation regulation (e.g., motivation regulation strategy types). As this is an observational study, I positioned each construct in terms of observations. For example, previous researchers often measured achievement goal orientations using survey instruments, but I measured achievement goal orientations in terms of statements. Whereas survey instruments asked students directly about their beliefs, I interpreted students' beliefs by analyzing their statements to each other.

This study contributes to research about the fundamental knowledge and theory of collaborative learning groups' motivational and social processes. With knowledge of what types of motivation and social processes occur between lowly and highly motivated student project

groups, future researchers, designers, and educators will be able to identify and then influence these processes in the future. Characterizing motivation and social constructs will allow future researchers to investigate which of these constructs is important and how the constructs relate to each other and learning outcomes. After this and future studies, educators will be able to design better group learning tasks, tools, instruction, and content for educator training.

Research Questions

The research questions are as follows:

R1: What types of motivational beliefs and cognitions, group behavioral engagement, context appraisals, motivational challenges, and motivation regulation emerge in two extreme cases of collaborative learning groups?

R2: In a group who rated their motivation as high and another group who rated their motivation as low, what types of mechanisms emerge to co-construct their motivational beliefs and cognitions, group behavioral engagement, context appraisals, and motivation regulation?

R3: What differences exist in motivational beliefs and cognitions, group behavioral engagement, context appraisals, motivational challenges, and motivation regulation between groups who rated their motivation as high compared to groups who rated their motivation as low?

CHAPTER 2: REVIEW OF THE LITERATURE

This chapter includes a review of collaborative learning literature and then the theoretical basis of this study, which is a combination of cognitive and situative motivation perspectives. Next, I synthesize findings from studies of knowledge co-construction mechanisms and mechanisms of group motivation to propose a new concept called motivation co-construction. After establishing a potential framework for how groups co-construct motivation targets, I dive deeper into each potential motivation target. The review of motivation targets includes cognitive and situative motivation constructs, and the research relevant to how student project groups afford and constrain their motivation and engagement. I describe each theoretical construct, including how it relates to collaborative learning. In addition, a synthesis of the research and gaps in the current research with regards to this study are included.

Collaborative Learning

Collaborative learning researchers have used a vast number of theoretical perspectives, methods, and instructional models derived from several disciplines including social, cognitive, developmental, educational psychology, learning sciences, and sociology (O'Donnell & Hmelo-Silver, 2013). Learning scientists are concerned with how cognitive processes interact with the educational ecosystem to afford students with opportunities to engage in deep learning (Sawyer, 2015). Within the learning sciences discipline, collaborative learning is a rich field of study (Hmelo-Silver, Chinn, Chan, & O'Donnell, 2013). Learning scientists view collaborative learning through information processing, socio-cultural, developmental, and cognitive theoretical lenses (Hmelo-Silver et al., 2013).

In addition, learning scientists utilize both quantitative and qualitative approaches to

study collaborative learning from a macro-level to in-depth explorations of turn-by-turn interactions between students. One methodological approach to studying collaborative learning that has been prominent in the learning sciences is the analysis of video observation data. By studying video case studies, learning scientists have described how deep learning occurs during the process of collaborative learning.

Through these lenses, researchers have illustrated a continuum of students' interactions between cooperative and collaborative learning. Cooperative and collaborative learning differ in the degree of mutuality and how students divide the labor. (Damon & Phelps, 1989; Roschelle & Teasley, 1995). In cooperative learning, students divide the task into pieces and tackle them individually (Roschelle & Teasley, 1995). A group is not being collaborative, but cooperative when one person imposes their views without negotiating with the group or the group divides and conquers the task without working together. Therefore, the mutuality, the back and forth, is low to moderate (Damon & Phelps, 1989). In contrast, collaborative learning includes students working together and building off each other's ideas with high levels of mutuality (Roschelle & Teasley, 1995). As a result, students in collaborative learning situations and those who use collaborative mechanisms, also engage in higher cognitive processes (Dillenbourg, 1999).

In studies of student group processes, researchers noticed that students were able to collaborate when they recruit joint attention from all members (Barron, 2003) and then coordinate their work in a joint problem space (Roschelle & Teasley, 1995). Inside the joint problem space, students communicate with each other synchronously (Dillenbourg, 1999), co-construct their knowledge to build knowledge that no group member had in the beginning (Hatano, 1993), and negotiate shared task perceptions, plans, goals, strategies, and evaluations (Hadwin, Jarvela, & Miller, 2018).

Project-based learning is an example of a learning model that includes collaboration as a cornerstone. Krajcik and Shin (2014) described project-based learning environments according to the following six key features: driving questions, learning mastery goals, student engagement in scientific practices, engagement in collaborative activities, scaffolding with learning technologies, and creation of a set of tangible products. Project-based learning can yield greater rewards for learning but also requires greater support (Krajcik & Blumenfeld, 2006). Education researchers have described the challenges of sparking, generating, and sustaining individual students' motivation and cognitive engagement in project-based learning (Blumenfeld et al., 1991).

True collaborative interactions require motivation and motivation regulation (Järvelä & Järvenoja, 2011). Coordinating group attention and negotiating have transaction costs such as communication, coordination of activities, and increased cognitive load (Kirschner, Paas, & Kirschner, 2009). As a result, many groups often underuse regulatory process (Malmberg, Järvelä, Järvenoja, & Panadero, 2015), metacognition (Hurme, Palonen, & Järvelä, 2006), and knowledge co-construction (Roschelle & Teasley, 1995). Groups need both the "will and skill." Without the group "will" (i.e., motivation), groups fail to enact the groups "skills" needed to learn and be successful. In other words, it is futile to teach students how to critically think, reason with each other, or think deeply if individual students and groups of students are not motivated to do so.

Theoretical Basis

In this study, I view motivation as both an individual psychological process and a social process of engagement and participation in the activity. I adopted this view based on the assumption that collaborative learning groups are dynamic social systems that encompass

individual students who are interdependent, self-regulating, and self-motivated (Järvelä, Volet, & Järvenoja, 2010). There are motivation processes occurring at both an individual and a group level (Volet, Summers, & Thurman, 2009). For example, an individual student may have low self-efficacy in the course, which causes him to be more likely to disengage and give up easily in the group activity (i.e., individual level); yet a situation could occur, in which another group member encourages that student to deeply engage with the material (i.e., group level). In this chapter, I present a review of the cognitive view of motivation and then the situative view of motivation. I first describe the cognitive perspective because it is the most prevalent perspective today in comparison to the emerging situative perspective on motivation. In the end, I advocate for combining both perspectives as the cognitive perspective provides concepts for studying individual's motivation and the situative perspective offers concepts for studying group motivation.

Cognitive perspective of motivation. The cognitive view of motivation is the most prominent perspective of motivation research today (Schunk, Meece, & Pintrich, 2012). The cognitive perspective emphasizes underlying student cognitive structures, motivation beliefs, and information processing, which drive goal-directed behavior. Motivation beliefs include students' beliefs about their competency (e.g., self-efficacy, self-concept, and conceptions of intelligence) and their values (e.g., interest, goals, utility). In this literature review, I include the following cognitive and socio-cognitive motivation constructs: achievement goal orientations (Elliot & Hulleman, 2017), competence perceptions (Marsh, Martin, Yeung, & Craven, 2017), causal attributions (R. P. Perry & Hamm, 2017), and students' context appraisals.

Cognitivist motivation researchers aim to predict and model how motivational cognitions either influence, inhibit, mediate, or moderate other motivation constructs, behavior, and

performance. Researchers typically use self-report data to build variable-centered generalizable models to investigate and gather evidence for these relationships (S. B. Nolen et al., 2015). The mechanisms and models are based on Bandura's (1986) theory of reciprocal determinism. In these models, motivation, behavior, and the social environment influence and are influenced by each other.. For example, cognitive researchers now have a large field of study from measuring self-efficacy on self-report surveys and then modeling self-efficacy to potential sources (i.e., precursors) and effects (Zimmerman, Schunk, & DiBenedetto, 2017).

Overall, the cognitive perspective of motivation provides value in investigating why, to what extent, and the nature of engagement in collaborative learning because it accounts for the mediating role of individual's beliefs, cognitions, and motives. However, the cognitive perspective does not offer flexibility in analyzing real-time, ever-evolving, states of motivation and engagement in collaborative learning activity as most of the cognitive motivation constructs are believed to be relatively stable across time (Järvelä et al., 2010). When cognitive researchers only use individual motivational constructs, they ignore the significance of emerging social processes (Järvelä et al., 2010). Therefore, adding a situative approach to the cognitive approach enables a more authentic picture of group motivation to be captured.

Situative perspective of motivation. The situative view of motivation blends well with learning in activity (Greeno & Engestrom, 2015) and group-level processes (Järvelä et al., 2010) because it accounts for the messy complexity of group activity. In comparison to the more cognitive views of motivation, situative motivation may be the most relevant because its theoretical origins began with a dual focus on the individual and group.

The current rise in situated motivation echoes similar calls made twenty years ago to situated cognition (Hickey, 2003). *Situative motivation* is a term used to describe theories of

motives and engagement according to *situated learning* (Lave & Wenger, 1991). Situative motivation theorists often also include perspectives from Engeström (2001), Greeno (1998), and Holland, Lachicotte, Skinner, and Cain (1998). In situated learning (Lave & Wenger, 1991), theorists define learning as a change in social practice (Greeno, 1989). Social practice is "doing in a historical and social context that gives structure and meaning to what we do" (Greeno, 1998, p. 47). By this definition, social practices can include reading, writing, and solving problems.

Situative theorists emphasize how learners are embedded in a context involving social and cultural systems. In cognitive theories, context is in the background and seen as something that acts on or is acted upon by individual students. In situative motivation, context is center stage. Context is not seen as being acted upon by students, but something that co-authors the situation with learners. For example, a cognitive analysis may include students' gender as something that *influences* students' motivation, whereas a situative analysis would view gender as inseparable from the student, thereby a situative analysis may include how the students' gender *affords or constrains* students' motivation. Situative motivation theorists focus on how and why features of situations produce motivation and engagement. Compared to a cognitive analysis that might ask students in a group whether collaborative learning is valuable, a situative analysis would also describe how collaborative learning fits into the students' world. How does collaborative learning conflict with other student activities? What opportunities does it provide students to interact with their peers? What does it mean to be a female in the group? Situative motivation assumes that these details about students' motivation-in-context shape how students identify in the group and engage in practices. Motivation will occur differently depending on the setting, structures, task, people involved, and learner differences such as goals and previous experiences. Different contexts are not said to cause motivation but to provide affordances for,

encourage, or support student motivation (Greeno, 1998). The same collaborative learning task may afford engagement one day but not the next (Paris & Turner, 1994).

In terms of motivation, situative theorists focus on *engaged participation* that is when students take up and display valued cultural practices of the community of practice (S. B. Nolen et al., 2015). In a lecture hall, this may be an individual student actively thinking about the material, paying attention, taking notes, and asking questions. In collaborative learning, valued cultural practices may include on-task behavior, using the language of the discipline, and persisting through challenges. Engle and Conant's (2002) theory of *productive disciplinary engagement* (PDE) has been especially influential in this emerging field. In PDE, engagement is culturally relative such that the context and community of practice inform what the researchers consider as engagement. For example, PDE in a business course may include the use of business vocabulary, cognitive processes in line with business concepts, and full attention. Engle and Conant (2002) described engagement as *disciplinary* when it was related to the task and *productive* when it was about "getting somewhere" (p. 403). Accordingly, students persisting and contributing to a discussion not related to the assignment (e.g., the weather) would not be PDE.

Situative approaches go beyond cognitive theories' view of learning as a change in mental structures because the individual alone cannot take up valued cultural practices. The take up of valued cultural practices is an interaction between the subject and the environment (S. B. Nolen et al., 2015). Said differently, situative theorists believe that motivation is also cognitive. For example, if an individual student believes the collaborative task will be difficult, this may constrain that students' engagement and motivation (Paris & Turner, 1994). However, the difference is that situative theorists believe the students' engagement is a joint product of the

students' cognitions and the environment. In this manner, a student is not "motivated", and an optimally difficult task is not "motivating" because either alone are not sufficient to produce the joint interaction of engagement (Paris & Turner, 1994). Situative theorists believe that students become motivated to engage when the social practice supports the students' developing identity or the practice is encouraged by central members of the students' community (Greeno, 1998). For example, students' engagement in a group task may be afforded or constrained by what their peer community encourages or they may see teamwork as a valuable skill to have as a future health care professional.

The process of group engagement and participation in the social activity occurs through emergent co-construction between the individuals and the greater social and cultural system. Joint creation is a subtle yet critical distinction of situative approaches (Greeno, 1998). Cognitive approaches perceive individuals and context as cause-and-effect, but situative approaches see individuals and context as tightly bound and practically inseparable (Lave & Wenger, 1991). Motivation is not an influence on learning but something that is inseparable from learning (Gresalfi, Martin, Hand, & Greeno, 2009). Motivation is not a cause or an effect of learning but an interaction between individuals and the context. Any student thought, such as "this task looks very difficult," is constructed inside of a greater cultural and social environment. This is not to deny the occurrence of individual differences in motivational orientation and the power of extrinsic reinforcement, but to place them in a minor role to the interactions between students and the situation (Paris & Turner, 1994).

Also, situative motivation differs from previous motivation theories due to the unit of analysis. The situativist shift to conceive learning as a change in social practice allows researchers to study larger units of analysis than the individual. The situative view does not focus

on students' motivation to learn but examines *motivation-in-context* (S. B. Nolen et al., 2015). Motivation is "stretched across" and distributed among people, settings, and time (Hickey & Granade, 2004; S. B. Nolen et al., 2015). Due to this perspective, motivation is measurable at the group-level. However, this does not infer that group-level motivation is the sum of each individual because the influence of an individual's motivation is rarely evenly distributed due to *power* and *positionality*. Positionality is someone's social standing derived from culture, racial and ethnic groups, gender, profession, age or more that influence someone's status (Nolen et al., 2015). Individuals' power and positionality are influenced by the context, which is why the unit of analysis is motivation-in-context (Nolen et al., 2015).

Overall, the situative perspective provides a paradigm shift for thinking of motivation beyond cause and effects. Motivation can be stretched across group members, the group task, learning environment, educator, the setting, and time. However, the perspective de-emphasizes the effect of individual motivation beliefs on individual student learning.

Combining both perspectives. My view corresponds to Jarvela and colleagues' (2010) argument to combine cognitive and situative perspectives when studying motivation in groups. This argument follows a wider ongoing debate of whether these two perspectives are theoretically compatible and ontologically incommensurate (Greeno, 2015). Ultimately, I take a pragmatic approach (Anderson & Shattuck, 2012; Dewey, 1938) of viewing both cognitive and situative perspectives, constructs, and methods as valuable resources for solving education problems. I believe the perspectives are complementary as they use different foci and definitions (Sfard, 1998) for motivation; socio-cognitivists viewing motivation as an individuals' "appetitive energization and direction of behavior with regard to effectiveness, ability, sufficiency or success" (Elliot, Dweck, & Yeager, 2017, p. 3) and situativists viewing motivation as a process

of engagement and participation in social activity (S. B. Nolen et al., 2015). Further differences between cognitive and situative perspectives are displayed in Table 1.

Combining the cognitive and situative perspective is possible because individual and social processes occur at the same time but at different systematic levels (Volet et al., 2009). Cognitive motivation theories offer a level of explanation for individual motivation processes while situative motivation theories explain group engagement (Järvelä et al., 2010). The views are related but conceptually distinct. One example is how both perspectives would view an individual psychological motivation construct; for instance, one group member attributing a low value to the course content. Socio-cognitivists would focus on how the individual's value influences and is influenced by the group while a situativist would position this individual's value as an aspect of the context for the groups' social motivation processes and engagement (S. B. Nolen et al., 2015).

Table 1

Differences Between Cognitive and Situative Perspectives in Motivation (Adapted from Nolen et al., 2015)

	Cognitive perspective	Situative perspective
Language	Influence, inhibit, mediator, precursor, outcome	Afford, constrain, sustain, emerge, attunements
Definition of motivation	"Motivation to learn" – goal-directed behavior	"Engaged participation" – taking up valued practices
The role of the "social"	Motivation as socially influenced by context	Motivation as socially constructed through interactions; individuals and context are inseparable
Unit of analysis	Psychological motivation processes; individuals influenced by the social system	Individuals in social systems of activity; motivation-in-context
Domains of motivation	Cognitive beliefs and thoughts, affective states	Cognitive, affective, interactional
Constructs	Motivational beliefs, achievement motivation, goals, appraisals	Identity, communities of practice, engaged participation, activity systems
Main mechanism	Reciprocal determinism (Bandura 1989)	Social and emergent co-construction
Research methods	Variable- centered models	Analyzing the same students across context (e.g., interviews, observation)

Greeno (2015), a founding theorist of situative perspectives, recommends that the goal of future research should be to analyze cases that provide integration of both perspectives at both systematic levels: the individual-cognitive level and the activity-system level. One example of an integrated approach is Engle and Conant (2002). Engle and Conant (2002) studied engagement in a class of fifth-grade students by focusing both on individual students and the classroom activity-

system level. By analyzing separate cases of giving an individual and an entire group authority to resolve learning issues, the authors concluded that providing students with authority is a guiding principle for fostering student engagement.

Mechanisms: Motivation Co-Construction

By combining cognitive and situative perspectives, I propose mechanisms for how students co-construct motivational beliefs, cognitions, and appraisals, potentially reaching a shared agreement around the motivational belief, cognition, or appraisal. To my knowledge, there are no collaborative learning studies that discuss the process of how groups co-construct motivational beliefs, cognitions, and appraisals. Nieswandt and McEneaney (2017) presented an unpublished study investigating whether group-level interest occurs. In their presentation, the researchers described *diffusion* as a group-level motivation process. Occasionally, one group member's interest would diffuse throughout the entire group. I believe Weinberger and Fischer (2006) analytical categories for knowledge co-construction may further delineate this vague process by deconstructing each step and positioning it as a social phenomenon. For instance, a more detailed account of diffusion would include the sub-processes of a student displaying their interest (i.e., externalization) and another student taking up the first student's emotions and thinking (i.e., integration).

To answer the research question "*in a group who rated their motivation as high and another group who rated their motivation as low, what types of mechanisms emerge to co-construct their motivational beliefs and cognitions, group behavioral engagement, context appraisals, and motivation regulation* ?", I have adapted approaches and concepts from how collaborative learning groups co-construct knowledge (Weinberger & Fischer, 2006), build knowledge (Bereiter & Scardamalia, 2017), and socially share in the regulation of their

cognition, motivation, and emotions (Hadwin et al., 2018). In these separate literature bodies, the theorists focus on types of individual and social dialogue moves and the targets of these dialogue moves. For example, Weinberger and Fischer (2006) targeted argumentation discourse. Within this target, Weinberger and Fischer (2006) proposed an analytical framework that included how individual students make argumentative dialogue moves according to the following types or categories: a simple claim, grounded claim, a question, or coordinating move. Also, Weinberger and Fischer's (2006) framework included the following social dialogue moves: externalization, eliciting, integrating, and consensus building. The individual moves were collected and analyzed irrespective of other group member's reactions while the social dialogue moves are the result of how the students interact with each other. By including both individual and social dialogue moves, researchers were able to distinguish which knowledge was at the individual level and then which knowledge was created, accepted, or shared at the group-level.

Researchers focused on motivation in collaborative learning groups have the opportunity to distinguish between individual and social dialogue moves and the motivation targets of these dialogue moves. In Table 2, I have applied concepts from knowledge co-construction (Weinberger & Fischer, 2006) and social regulation (Hadwin et al., 2018) to what I propose as *motivation co-construction*.

I define *motivation co-construction* as groups constructing or enacting shared motivation beliefs, knowledge, strategies, or behaviors. I will use competence perceptions to illustrate the differences between the different levels and targets. *Collective efficacy* is an individual student's belief about how confident they are that their group will succeed in the task (Bandura, 2002). Researchers can measure each group member's *collective efficacy* using scales on self-report instruments (Bandura, 2002). Even if the group members do not realize it, each one has mentally

determined collective efficacy, but may not discuss it with the group. If a group member said, "I think we will do well on this assignment," then that individual is externalizing a motivational belief targeting the group-level as that individual used the word "we." At this point, the group has not taken up the individual activation statement, so it is not a shared group-level belief. However, if group members did converse and elaborate on each other's confidence in the group, then they would be using *motivation co-construction* processes. In the end, the group may agree or disagree that they will do well.

Table 2

Categories of Motivation Co-construction*

Category	Level of the Co-construction	Description and Examples
		Activation
Externalization of motivation target pertaining to self	Individual level	Externalizes a motivation target pertaining to the self through behavior or statements *Example:* "This assignment is too hard" "I will do well on this assignment"
Externalization of motivation target pertaining to a peer	Individual level	Externalizes a motivation target pertaining to a peer through behavior or statements *Example:* "You will do well on this assignment"
Externalization of motivation target pertaining to the group	Individual level	Externalizes a motivation target pertaining to the group through behavior or statements *Example:* "We will do well on this assignment"
Eliciting motivation target	Individual level	Questioning the motivation target of a group member or provoking a motivational reaction from a group member *Example:* "Do you think this assignment is too hard?"

Group Take-Up		
Quick building	Group level	The statement is met with simple agreement (e.g., "uh huh", "yea", head nod) by members of the group (at times to simply move on). Individual group members portray that they hold similar goals, plans, and evaluations
Elaboration building	Group level	Another group member either builds on, relates to, or refers to the reasoning of the activation statement. Does not reject the previous statement *Examples:* "Yes, and…" "We could also try…"
Conflict-orientated building	Group level	Disagreeing with, modifying, or replacing the motivational orientated statement of another group member *Examples:* "No, I don't think…" "Actually, I think it is…"
Outcome		
Shared agreement	Group level	Members of the group reach a negotiated agreement that was more than one individual's contribution *Example:* "Ok, so this task is going to be hard, but we think we can do well on it."
Ignored	Individual level (i.e., no co-construction)	No communicated agreement from other group members. Either other members do not respond directly to the statement or do not respond at all.
Established agreement	Group level	Passive agreement due to individuals either reluctantly agreeing to or spontaneously holding the same idea *Example:* "Ok, let's go with Sharon's idea"
Lack of group agreement	Group level	Agreement was not met
Individual integration	Individual level	Taking over, integrating, and applying the motivation of another group member into one's own motivation *Example:* A student switches from wanting to learn the material to only caring about completing the task when all the other group members voice their motives

Note: *Motivation target includes behavioral engagement, interest, motivation beliefs, motivation knowledge, motivation strategies and processes. Adapted from Weinberger and Fischer (2006) and Hadwin et al. (2018)

I propose that groups construct shared motivational beliefs, cognitions, and appraisals through different types of activation and then different types of group take-up. First, in activation, individual group members may externalize motivation related behavior, statement, appraisal or elicit another group member to externalize a motivation related behavior, statement, or appraisal. Then other group members may choose to ignore the externalization or build upon it. Building upon the externalization can include simple agreement, elaboration building or conflict-orientated building. Simple agreement may occur when group members spontaneously agree with the statement, or the members do not care enough to elaborate or disagree. Simple agreement results in an established agreement. Elaboration building consists of members relating to and building upon the statement that activated the co-construction. Elaboration building usually results in a shared agreement that would not have been possible for just one individual to create. Lastly, conflict-orientated building includes instances when students disagree with, modify, or replace the statement of one student with their own statement. When conflict-orientated building is present, this can result in lack of group agreement.

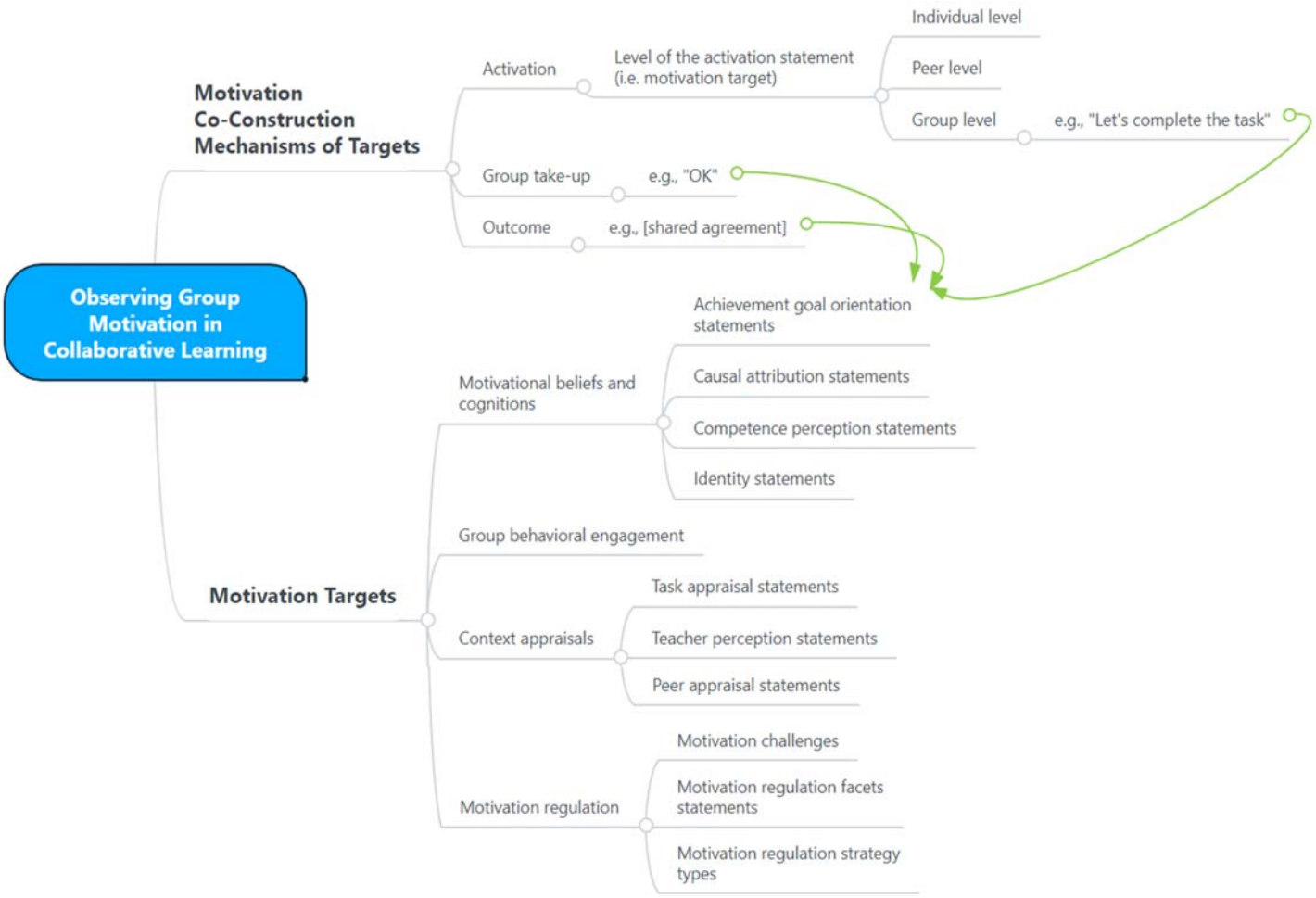

Figure 1. Concept map of upcoming motivation co-construction mechanisms, motivation targets, and an example of how motivation targets are co-constructed

Motivational Beliefs and Cognitions

The mechanisms and processes for motivation co-construction are not unlike how groups co-construct knowledge or share in group regulation. What makes this type of co-construction specifically *motivation* co-construction is that the targets of the construction are motivation related. As demonstrated in Figure 1, I have reviewed the mechanisms and theoretical perspectives for motivation dynamics in collaborative learning. Now, I dedicate the remainder of the chapter to the targets of these mechanisms. In the subsequent section, I review the following

four relevant motivational beliefs and cognitions: achievement goal orientations, competence perceptions, causal attributions, and identity.

Achievement goal orientations. Originating from a cognitive perspective of motivation, achievement goal theory is a framework for how students perceive, experience, and choose learning tasks, behaviors, and strategies (C. S. Dweck, 1986; Elliot & Hulleman, 2017). Achievement goal theory began in the 1980s by researchers studying students' reactions to challenge (C. S. Dweck, 1986; Nicholls, 1984). Now, it is one of the most frequently applied motivation theories.

Achievement goal theorists assume that individuals' behavior is a result of their reasons for learning and their definitions of ability and success. Aligning with other perspectives (Ryan & Deci, 2000a), achievement goal theories focus on the quality of motivation and not the level of motivation. In other words, achievement goal theoriest do not divide students into high or low levels of motivation. Rather, theorists emphasize qualitative differences in students reasons underlying students' goals, and the purpose of their goals (Elliot & Hulleman, 2017).

The theoretical model for achievement goals has gone through several iterations; starting with a dichotomous model of mastery goals compared to performance goals (C. S. Dweck, 1986). Students create mastery goals to learn and develop their expertise; whereas performance goals are intended to attain or demonstrate the students' competence (Elliot & Hulleman, 2017). For example, a student may study for a test either because they want to get a good grade (i.e., performance goal) or because they want to become a better doctor (i.e., mastery goal). Based on this distinction, every student could attain their mastery goal, but not every student can attain a performance goal (Nicholls, 1979, 1984).

Hulleman, Schrager, Bodmann, and Harackiewicz (2010) conducted a meta-analysis of

243 correlational studies of self-reported achievement goals for individual students. In that study, the researchers found that the mastery or performance goal distinction is mainly unrelated to academic grades and test scores. However, students with mastery goals reported greater motivation outcomes and reported the use of deeper learning processes. In other self-report studies, students with mastery goals report greater interest, positive emotions, task value, self-regulation processes, use of deep learning strategies than students with performance goals (Elliot & Hulleman, 2017).

The dichotomous model then expanded to a 2 x 2 model by separating mastery and performance orientations into approach and avoidance forms (Elliot, 1999; Pintrich, 2000). Researchers described approach goals as striving towards a goal such as appearing better, improving skills, or attempting to learn whereas avoidance goals are when students' motive is to prevent either looking bad, a decline in their skills, or failure (Elliot et al., 2017). For example, a student may approach an assignment by saying "let's get a 90% on this next assignment" compared to a student with an avoidance orientation who would say "let's not get a bad grade on the next assignment." Unlike the mastery or performance goal type research, correlational research that further distinguishes between *approach* or *avoidance* orientations has demonstrated varying levels of academic performance (Moller & Elliot, 2006). Researchers have found that performance and mastery *avoidance* goals are associated with poor academic performance, most likely due to other related behaviors such as high anxiety, help-avoidance, self-handicapping, and low self-efficacy (Elliot & Hulleman, 2017). Between performance approach and mastery approach goals, they share associations with effort and persistence (Elliot, 1999), but performance approach goals are also associated with surface level cognitive processing (Graham & Golan, 1991) and test anxiety (Huang, 2011).

Table 3

The 3 x 2 Theoretical Model for Achievement Goals

	Performance (other)	Mastery Self-based	Mastery Task-based
Approach	To do or look better than others	To develop one's ability by doing something better, quicker, or more enjoyable than the student did before (improve skills)	To complete the absolute demands of a mastery task (striving to learn)
Avoidance	To *not* do or look worse than others	To avoid losing one's ability by *not* doing something worse, slower, or less enjoyable than the student did before or (avoid skill decline)	To *not* complete the absolute demands of the task incorrectly (avoid learning failures)

Note: Adapted from Elliot, Murayama, and Pekrun, 2011.

As shown in Table 3, the most recent model is a 3 x 2 model proposed by Elliot, Murayama, and Pekrun (2011). In the 3 x 2 achievement goal questionnaire, mastery approach goals are further separated by whether the goal is self-based or task-based (Elliot et al., 2011). Students with self-based mastery goals aim to improve their skills based on their competence trajectory. By contrast, students with task-based mastery goals aim to complete the absolute demands of the task such as turning in an assignment or understanding a concept (Elliot et al., 2011). In previous research using the 3 x 2 model of achievement goal theory, researchers have tested whether the 3 x 2 model of achievement goal theory is a better fit for self-reported achievement goals than the 2 x 2 model by conducting confirmatory factor analysis, intercorrelations, and deriving internal consistencies (Elliot et al., 2017). Several researchers (Diseth, 2015; Elliot & Hulleman, 2017; Elliot et al., 2011) have concluded that the 3 x 2 model is indeed a better fit for self-reported achievement goal data than the 2 x 2 model. These researchers found that the 3 x 2 model does not change previous findings about the associations between outcomes and the mastery versus performance orientation nor the avoidance versus

approach orientation (Elliot & Hulleman, 2017). Thus far, the outcome differences between task-based and self-based goals are not apparent, although the research is in its infancy.

Overall, the research and theory of achievement goal orientations are promising and evolving, yet much of this research is self-reported correlational research investigating individual student motivation for entire courses. What remains unclear is whether these achievement goal orientations have implications when students are situated in collaborative learning tasks and environments. Although researchers have applied achievement goal orientation theory more often to individual student learning, there are some studies and insights that apply to group settings.

Achievement goal orientations in collaborative learning. Kim, Kim, and Svinicki (2012) developed and tested a self-report achievement goal orientation scale that measured achievement goals on the following three levels: a) individual, b) individual-within-a-group, and c) group. The individual level contained similar items to the traditional scale, decontextualized goal orientations for mastery, performance approach, or performance avoidance. The individual-within-a-group level consisted of items written with "my" but situated in collaborative learning. For example, a mastery orientation for individual-within-a-group student would align with the statement, "my purpose for engaging in the task is to contribute to developing competence as a group." Lastly, the group level was written using the word "our" and signifies shared goals that a group has for the group's competence. For example, a group with a performance approach engages in the task to demonstrate competence compared with other groups. In addition to Kim et al. (2012) study results, other study results and theoretical perspectives can be organized according to these three levels of achievement goal orientations.

Even though the individual level of goal orientations is decontextualized from

collaborative learning, a students' default goal orientation may affect collaborative learning and vice versa. In fact, a prominent goal orientation theorist proposed collaborative learning as a means to encourage students' mastery goal orientation as goal orientations are thought to be malleable (Ames, 1992; Meece, Anderman, & Anderman, 2006). Theoretically, mastery orientation is advantageous for group learning and peer teaching because students with a performance-approach may be more focused on looking good in comparison to others (Rogat, Linnenbrink-Garcia, & DiDonato, 2013). Also, students with a performance-avoidance approach may exhibit behaviors aimed at avoiding looking bad; hindering the likelihood that they ask important questions in the group (Middleton & Midgley, 1997; Rogat et al., 2013).

By conducting post collaborative learning interviews, observations, and surveys, researchers have distinguished behavioral differences between individual students with a mastery goal and performance goal orientation in collaborative learning. Students with a mastery goal orientation promote more effective collaboration and satisfaction with group learning (Hijzen et al., 2007; Kristof-Brown & Stevens, 2001; Sins, van Joolingen, Savelsbergh, & van Hout-Wolters, 2008). Throughout the group learning process, students with a mastery goal orientation are more open to others' ideas, both weak or strong ideas (Marijn Poortvliet, Janssen, Van Yperen, & Van de Vliert, 2007) and those that oppose their own views (Darnon, Muller, Schrager, Pannuzzo, & Butera, 2006). Also, students with a mastery orientation were observed to use more collective pronouns "we" and "us" (Harris, Yuill, & Luckin, 2008); a socioemotional interaction linked to fostering group cohesion (Rogat & Adams-Wiggins, 2015).

While students with a performance orientation participate in interactions as much as the mastery orientated students (Gabriele & Montecinos, 2001; Harris et al., 2008), performance orientation leads to behaviors misaligned with the goals of true collaborative learning (Roschelle

& Teasley, 1995). For instance, these results-orientated students exhibit cautious opinions (Marijn Poortvliet et al., 2007), criticism (Harris et al., 2008), and favoritism (Levy, Kaplan, & Patrick, 2004). Also, these students uphold their success above others as they are dismissive of other members' weak ideas (Darnon, Butera, & Harackiewicz, 2007; Darnon et al., 2006), but are accepting to strong ideas (Marijn Poortvliet et al., 2007). It is unknown whether these behaviors are productive for the groups' learning or performance, but more research is needed (Senko, Hulleman, & Harackiewicz, 2011; Sins et al., 2008).

Nolen's (2007) study of class-wide engagement may offer potential mechanisms for how individual students take up goal orientations within groups. In Nolen's 2007 study, the class positioned certain students as a "more capable other" and others as "struggling." Because of this positioning, the struggling students took up a performance avoidance goal orientation. Due to ego involvement, these students would withdraw from the learning to avoid looking incompetent in front of others. Although this study was not conducted in small group learning, the same type of mechanisms may occur. For example, a collaborative learning group may position a mastery orientated student as struggling that causes the student to switch to a performance avoidance orientation to protect their self-worth.

Although the research on individual goal orientations has contributed to the literature, these researchers did not consider students' goal orientations *for* the collaborative learning. The goal orientations that students adopt from the classroom goal structure are important, but their small group is another important sub-context (Pintrich, 2003). In Kim et al. (2012) study, the authors found evidence that students, in general, may hold mastery or performance approach goal orientation for their own learning but, simultaneously, hold a different goal orientation for the collaborative learning. Of note, there was also evidence that students who hold a performance

avoidance goal orientation still hold this same orientation for collaborative learning (Kim et al., 2012). Although these results further situate goal orientations within collaborative learning, there were several limitations with this study. It was a one-time lab-based study in which participants grouped together to solve crossword puzzles. It would be beneficial to study whether actual students' goal orientations differ between individual goals, individual within a group, and the group level and then relate them to motivational and learning outcomes.

Rarely do studies conceive of mastery and performance orientations at the level of the group. Kim et al. (2012) developed an instrument to test for group-level achievement goal orientations, but researchers have not used the instrument in other studies. In another study, Rogat presented a paper at the American Educational Research Association in 2004 that used a hierarchical linear model to examine group level goal orientation (Rogat et al., 2013). She asked students to perceive whether their group was mastery or performance focused. She found that mastery focused students who perceived their group as mastery were more behaviorally engaged. Hijzen and colleagues (2007) found evidence for group-level achievement goal orientations by interviewing what they called "effective" and "ineffective" collaborative learning groups. The researchers determined the dichotomy between effective and ineffective by differences in how the students rated the quality of their groups' collaborative learning. They found a higher incidence of mastery goal related statements in interviews of the effective groups compared to the ineffective groups. Hijzen et al. (2007) used content analysis to classify students' statements into performance or mastery goal orientation.

No researchers have observed whether or how group-level achievement goal orientations emerge, change over time, or conflict with individual goal orientations. However, several studies of individual student achievement goals offer potential conjectures for the mechanisms of group-

level goal orientations. One potential conjecture is that students perceive what the goal orientation is of the class and the group and align their goal orientation with these. Based on prior experiences, students completing individual tasks perceive whether they think a classroom supports a mastery goal orientation and then are more likely to adopt a mastery orientation (Meece et al., 2006). Rogat and colleagues (2013) argued that students eventually come to hold common achievement goals while working together. The students' and group's goal may lead to engagement or disengagement depending on the group task. Kaplan (2004) proposed that students engage with group work depending on how they perceive the match between the group task and their personal achievement goals.

Little is known about the changes in goal orientation over time. One study (Middleton, Kaplan, & Midgley, 2004) surveyed the same students' goal orientations over two years and found it was a relatively stable construct. However, it may be that students' goal orientations change throughout each semester as students are required to increase their effort. Hazley, Soh, Miller, Chiriacescu, and Ingraham (2014) measured goal orientations of college first-year students at both the first week and last week of their computer science course. The authors found that the class mean for each scale rating shifted negatively over the semester. For example, learning avoidance, related to mastery avoidance, increased at the end of the semester. These results have implications for when to intervene on students' goal orientations as it appears students need assistance in maintaining their positive goal orientations throughout the semester. In Hazley et al.'s (2014) study, a change in goal orientation predicted course grades, knowledge retention, and self-regulation. Future researchers could investigate whether the context of time also has implications for collaborative groups, specifically individuals' goal orientations and the group-level goal orientation.

Summary of achievement goal orientations. Despite a rigorous research body on how achievement goal orientation affects individual students' learning and performance in the classroom, there is a dearth of empirical research on how achievement goal orientation affects individuals and groups in collaborative learning. What is still unknown is how these goal orientations emerge in moment to moment interactions between the student and the task and how these progress over time. To my knowledge, researchers have not coded for achievement goal statements by observing collaborative learning sessions. However, Harris et al. (2008) encouraged future researchers to explore how to characterize an interaction as mastery- or performance-orientated by identifying patterns of participation. Measuring achievement goal statements would contribute to the discourse of whether achievement goals are more context-dependent or dispositional (Harris et al., 2008) or whether this differs for each student as Pintrich (2000) argued that some students may have strong dispositions for one type of goal while others may show greater variability depending on the context. Researchers who argued for a context-dependent achievement goal orientation (Ames, 1992; Blumenfeld, 1992; Harris et al., 2008) have theorized how differences in contextual classroom or task factors afford students' goal orientations. Overall, goal orientation theory has yielded important insights to date on how categorical differences in students' motives influence other motivation and learning outcomes. However, the theory does not address how students' motivation is affected during positive or negative events.

Causal attributions. Causal attribution theory addresses how students differ in their interpretation of positive and negative events and how these interpretations affect other outcomes. Students' causal attributions are associated with their interpretations of positive and negative events (Ames, 1992). In Weiner's (1985) attribution theory, he called these

interpretations *causal attributions*. Attribution theory has been a seminal line of research in individual students' motivation processes and has potential implications for collaborative learning (R. P. Perry & Hamm, 2017).

When a learning outcome occurs such as receiving low marks, students create attributions according to three dimensions (Weiner, 1985). First, students determine the locus of causality. The locus of causality implies whether the cause was the student's fault or it was outside of the person (e.g., skill vs. luck). Second, the students examine whether the cause was stable or unstable (e.g., effort or natural ability). Last, students' interpretations differ on the degree of control. For example, a student group could attribute a low grade to how the teacher graded their work or the effort they put forth.

The types of attributions students create determines their subsequent cognitions and emotions. Based on attribution theory, students who ascribe a failure to *internal, stable,* and *uncontrollable* cause (e.g., the student has low natural aptitude) will have depleted motivation, less persistence, and poor performance (R. P. Perry & Hamm, 2017). If the student thinks the cause is stable, it is expected that their expectations for future success would decrease and they would feel hopeless, because they see the cause as stable. Also, the student would decrease their level of responsibility for the task if they perceive the cause as uncontrollable. Meanwhile, they might feel shame if they believe the cause was their fault.

Conversely, a student who attributes a failure *to internal, unstable*, and *controllable* cause (e.g., low effort) would expectedly put forth more effort, be persistence, and attain higher performance in the future (R. P. Perry & Hamm, 2017). Attributing the cause to a controllable factor leads a student to take greater responsibility for future work and feel guilt. Guilt, in contrast to shame, is a motivating emotion (R. P. Perry & Hamm, 2017). Also, students increase

their expectations for success when they perceive the cause of the previous failure as unstable because then students see an opportunity to change the cause of failure.

Causal attributions are directly related to achievement goal orientations. Students with a mastery goal orientation are more likely to carry adaptive causal attributions; attributing failures to unstable and controllable factors such as lack of effort (Ames, 1992). In contrast, students with performance goal orientations attribute failures to lack of ability (i.e., stable, uncontrollable, internal).

Although individual-level attributions are more commonly studied, Weiner also theorized that individuals create attributions for other's behavior at the peer-level (Weiner, 2006). Interpersonal attribution theory (Weiner, 2006) may be especially relevant for motivation dynamics in collaborative learning. Weiner suggested that people judge other's poor behavior on whether one thinks the other was in control or not. Based on whether a person believes the other person was in control or not, individuals determine whether that person is responsible (Weiner, 2006). Comparable to how individuals are always asking "why" outcomes occurred to them, individuals are also asking "why" other people behave in non-pervasive manners.

In a group learning situation, students may ask themselves consciously or unconsciously, "why are they not participating?", "why did they not complete their part of the assignment" or "why are they dominating the discussion?" Juvonen and Weiner (1993) argued that whether students judge their peers' behaviors as intentional or uncontrollable, decides how they feel about their peers, which in turn, influences how they interact with their peers. This is especially true when a peer's behavior negatively affects another student or is perceived as not adhering to cultural norms (Juvonen & Weiner, 1993). In Juvonen and Weiner's (1993) review of the research on peer relationships, aggressive and shy students are the most unpopular, but students

dislike aggressive peers more because they have a greater impact on their classmates. Their classmates shun these students and receive less academic support from their peers. However, peers will give support and feel sympathetic to students with non-pervasive behavior that they attribute their behavior as uncontrollable (Juvonen & Weiner, 1993).

Although the peer relationship research originates from studies of elementary and secondary students, there are connections to studies of group work in schools for the health professions. In several studies of group work problems, health professions students claimed the largest barrier is personality conflicts (Edmunds & Brown, 2010; Houlden et al., 2001; Virtanen et al., 1999). They described students they labeled as "dominant," "know it all," or "aggressive" as a significant group work challenge (Tipping et al., 1995). Also, Weiner has investigated how adults and college students create interpersonal attributions, regulate conflict, and manage their social image (Juvonen & Weiner, 1993).

Students who are aware of how other's judge them, according to whether other students believe their behavior is controllable, conduct impression management by using the following two strategies: excuse making and eliciting social approval (Weiner, 1985). Students deflect judgments of responsibility by making excuses that reveal that the cause was uncontrollable. Weiner tested this phenomenon with college students in a clever lab experiment (Weiner, Amirkhan, Folkes, & Verette, 1987). In a group setting, Weiner arranged for an actor to come in late to the experiment and either give no excuse or an excuse revealing a controllable or noncontrollable cause. Aligned with his theory, when the actor gave an uncontrollable excuse, they were rated more favorably by the college students. In addition to excuse giving, many college students understand how to elicit social approval. College students use a variety of strategies to gain approval, but as a trend, students attempt to appear effortful and take

responsibility for positive events (Weiner & Kukla, 1970).

To my knowledge, researchers have not studied interpersonal attribution theory in group learning settings. However, the interpersonal theory is relevant to commonly reported problems that health professions students experience in group settings such as personality conflicts and unequal participation (Houlden et al., 2001; Virtanen et al., 1999). Students may be making different types of attributions towards other students' behaviors while they work together in a group. In addition, collaborative learning groups may co-construct attributions after positive and negative events. Attributions may play a key role in motivation dynamics in groups, but this construct would need to be coupled with other motivation theories as it just covers how student interpret positive and negative events.

Competence perceptions. Another potentially important factor for understanding motivation dynamics in collaborative learning is how students judge their own competence. In this review, I operationalize *competence self-* and *group-perceptions* as an umbrella term for the following related constructs: academic self-concept (Shavelson, Hubner, & Stanton, 1976), self-efficacy (Bandura, 1977), expectations for success (Wigfield & Eccles, 2000) and need for competence satisfaction (Ryan & Deci, 2000b). Most of these concepts originated from work by White (1959) who established students' sense of competence as a foundational source of motivation. Students with high competence self-perceptions succeed in schools, social settings, and daily living (Marsh et al., 2017) because these perceptions affect students' choices, effort, and persistence (Schunk & Pajares, 2005).

Several motivation theories include constructs relating to competence self-perceptions, but these constructs have been named, developed, and studied in isolation from each other. Marsh et al. (2017) argued that this phenomenon has led to "jingle-jangle" fallacies in which one

construct is defined in multiple ways while two constructs are identical. Academic self-concept, self-efficacy, expectations for success, and need for competence satisfaction have significant overlaps with a few differences (Marsh et al., 2017). Authors define academic self-concept as the self-perceptions students create through their academic experience and interpretation of their academic environment (Shavelson et al., 1976) and self-efficacy as the self-belief that one will do well in an upcoming task (Schunk & Pajares, 2005). Historically, theorists conceived of academic self-concept as more domain general than self-efficacy; both are now considered to be specific to a narrow domain such as the belief that one will do well in group work. The two constructs differ in that academic self-concept is measured by asking students to compare themselves to peers whereas self-efficacy measures do not incorporate social comparison. Expectancy-value theorists also utilize social comparison to measure expectations for success or operationalize the construct using self-concept measures (Wigfield & Eccles, 2000). The last construct, need for competence satisfaction, is a component of Ryan and Deci (2000) self-determination theory of student motivation. Ryan and Deci assumed students have a need for competence and this is why they pursue challenging tasks.

Constructs of competence self-perceptions share similar mechanisms. Students determine their competence self-perceptions by comparing themselves to peers, externally established standards, past performance, or feedback from significant others (Marsh et al., 2017). Students create high competence self-perceptions when they accomplish a challenging task (Usher & Pajares, 2008). Also, students judge their competence self-perceptions based on observing others succeed and receiving encouragement from significant others (Bandura, 1977). However, certain physiological and emotional states such as anxiety can negatively affect students' competence self-perceptions (Rogat et al., 2013).

Based on these mechanisms, it is reasonable to assume that the collaborative learning setting will affect individual and collective competence self-perceptions. Collaborative learning provides opportunities for students to observe other peers' motivational beliefs and behaviors. It also affords possibilities for students to receive feedback on their work from their peers. Researchers have theorized that when students take on group leadership roles, provide explanations to their peers, and successfully contribute to the group, students solidify their feelings of competence (Rogat et al., 2013). Opportunities in collaborative learning can either positively (Fencl & Scheel, 2005) or negatively (Rogat & Linnenbrink-Garcia, 2011) affect students' self-efficacy, which could, in turn, affect their choices, effort, or persistence in group work (Schunk & Pajares, 2005). Groups who have students with high competence self-perceptions use more deep level strategies, and ultimately, achieve higher group performance (Wang & Lin, 2007).

Individual-level and group-level competence perceptions lead to higher quality group interactions, which lead to enhanced group performance (Rogat et al., 2013). Of the competence self-perception constructs, researchers have studied self-efficacy the most frequently in collaborative learning. Self-efficacy is not only an individual target but a group target that Bandura defined as *collective efficacy* (Bandura, 1997). Collective efficacy is a group's belief in their ability to execute a task successfully (Bandura, 1997). Although higher individual self-efficacy leads to collective efficacy, this group level construct is not necessarily the sum of its parts as groups can have high collective efficacy despite individual students exhibiting low individual efficacy (Gibson, 1999). When groups do establish collective efficacy, group members handle challenges more effectively and exert more effort (Bandura, 2002).

Identity. Achievement goal orientations, causal attributions, and competence perceptions

make up three important variables for how cognitive motivation theorists describe students' "motivation to learn." As a value-added perspective, situative theorists study identity as an important aspect of how and why students take up valued cultural practices.

As McCaslin and Hickey (2001) argued, motivation is centered on identity and is an important construct to account for in group motivation processes. Identity has emerged as an important interaction between individuals and the context that influences engagement and participation in practices. S. B. Nolen et al. (2015) defined identity as both the identities assigned to people through their social position and identity as self-understandings people create around what they are learning. Students are continually forming their identity, such as a future health professional would think about what it means to be a health professional (e.g., a nurse), and what it means to be a "good" health professional. These self-narrations influence the practices students take up and the decisions they make (Turner, Christensen, Kackar-Cam, Trucano, & Fulmer, 2014). One of the most salient examples in health care is students' choice of specialty. Often students choose a medical specialty for their sense of belonging to that specialty because they decide it "fits" them (Burford, 2012). They may say, "I want to do primary care because I'm a people person."

Specifically, students behave and think through their *practice-linked identities* (Nasir & Hand, 2008). Practice-linked identities are who one is or whom they are becoming through their participation in a social activity. Some practices follow more stringent rules for participation than others including the level of engagement required of participants. For example, a surgery team is expected to have a deep level engagement from all participants, but collaborating in class requires far fewer rules and various levels of engagement. Someone's practice-linked identity when they are in collaborative learning might be, "the one who does all the work." Students take up, construct, and embrace practice-linked identities that are linked to a particular social and

cultural practice (Nasir & Hand, 2008). Also, for these identities to be strong, the person must feel a connection to the practice. Thus, students who do not value collaboration may have a weaker collaborative learning practice-linked identity.

Individuals and their surroundings socially construct identity (Gee, Allen, & Clinton, 2001; Holland et al., 1998). Holland et al. (1998) described two aspects of identity: a *positional* form and a *narrative* form. *Positional identity* is how characteristics such as race, gender, and others socially position people. In turn, students can either adopt or reject positional identities from society (Holland et al., 1998). Similarly, students will assign positional identities to their peers. Positional identities grant learners more or less access to activities, resulting in patterns of dominance, non-participation, or marginalization that are deeply rooted in the social and cultural environment. In turn, this social positioning contributes to the student's *narrative identity*. Narrative identities are descriptive understandings, which individuals create for themselves. For example, a student could describe themselves as friendly and also say they have a friendly group.

In addition, students negotiate their identity in relation to other people. For example, a student may internally negotiate that they are quiet because they find other people in their group very talkative and loud. This example features *identification*: the process of incorporating resources into a personal narrative (S. B. Nolen et al., 2015). Individuals are continually interacting with the world to figure out who they are. In Nolen and colleagues' (2011) study, students used mentor's feedback on their performance and their reactions to instruction to form their emerging future professional identities. People never stop taking in information from the world and judging it to form who they are (Erikson, 1994). Reactions to everyday challenges and success solidify into dispositions and typical adaptations (McCaslin, 2009). As more powerful others (i.e., dominant peers, professors) view these dispositional patterns as typical, students

attain identities such as “unmotivated” or “gunners” (Hand & Gresalfi, 2015).

Contradictions are a vital mechanism in identity because identity contradictions afford superficial engagement. There can be contradictions between a practice and someone’s identity and contradictions between different contexts such as school and practice (S. B. Nolen & Ward, 2008). For example, Nolen and colleagues (2011) studied “teacher take-up” of pedagogical practices by following teacher education students back and forth from the classroom to their practice sites and then finally, to their first jobs. This example is similar in context to following a health professional student back and forth from the classroom to their clinical rotations and then later to their first job. In Nolen and colleagues’ study (2011), one representative student said she did not enjoy learning about assessment because she was a “big picture person” but she also knew it was important because of her practice site. Despite her knowing it was important, she still resisted learning about how to assess students. It was not until she became a teacher herself that she began taking up assessment practices. In this case, the only aspect that changed was her identity from a student to a professional. As a teacher, her motives changed because she wanted to develop an identity as a full participating member of her workplace (i.e., community of practice). Since assessment practices were a valued practice in that community of practice, she began to take up those practices as a route to *community membership* (Lave & Wenger, 1991). In the end, this case shows that a stronger identity such as a practitioner moving to the master practitioner overrules contradictions between identity (“I’m a big picture person”) and practices (assessment).

Theorists often describe these identities at the individual level or a social group such as women. However, it is possible that students also attribute identities such as “unmotivated” or “gunners” to a collaborative learning group based on given identities by their peers and

professors (Hand & Gresalfi, 2015). Students are constructing their individual and group identities based on feedback and how they position themselves in relation to others. For example, a study by Sullivan and Wilson (2015) was a remarkable case study of how students use *playful talk* to position their own and other students' selected identities inside the collaborative learning group. The students in this case primarily used joking to position themselves as more competent, a victim, or the parent of the group (Sullivan & Wilson, 2015).

The identity construct is also present in accounts of social regulation research in collaborative groups, but the researchers did not highlight the identity construct. For example, Volet and Mansfield (2006) reported this excerpt from a business school student discussing the success in regulating other group members' motivation, "I guess I can be a motivator … lead by example…" (pg. 351). Volet and Mansfield (2006) coded this student as having positive appraisals for group work and having a mastery goal approach, but what is also apparent, is how this student has developed an identity as a group motivator. Isohätälä, Järvenoja, and Järvelä (2017) also present an exemplar of group identity but do not interpret the excerpt directly as group identity. In their study, four Finnish teacher education students made claims such as, "We have such mathematically talented people… and people who think logically," The authors analyzed this case as an instance of high participation and group regulation. I perceive this case as an example of how students form identities about their collaborative learning groups. It is some of the first research evidence that group-level identity formation may also follow similar mechanisms (i.e., social comparison) as individual level identity formation.

Summary of motivational beliefs and cognitions. Research on the three prominent cognitive motivation constructs (i.e., achievement goal orientations, competence perceptions, and causal attributions) has mainly focused on individual student contexts, but these concepts are

also emerging as important factors in collaborative learning research (Rogat et al., 2013). Future researchers should study that of these concepts emerge in collaborative learning and how they relate to each other and other important outcomes. This work would lead not only to a greater understanding of group motivation but could provide greater insight into student motivation in individual contexts. Studying collaborative learning has an advantage in that some thoughts that would only occur in a students' head while completing an individual task are voiced in collaborative learning. Also, questions remain about what level these concepts emerge. Are they just individual factors or do groups of students also exhibit a unified goal orientation, causal attribution type, or competence self-perception? Moreover, if so, how does this occur?

Overall, the situative construct, identity, appears to influence students' academic motivation and engagement (Nasir & Hand, 2008; S. B. Nolen et al., 2011). Although the construct has been underexplored in collaborative learning settings, individual and group-level identity processes may be an important mediator of group motivation and engagement. How a student sees themselves may influence which group roles they take on and how they interact with their group members. However, collaborative learning researchers often do not use the construct to explain shifts in engagement or motivation.

Group Behavioral Engagement

Research on engagement became prevalent when development psychology researchers began exploring high school dropout rates. They used engagement to describe students' active relationship with their high school community. Now, researchers from various disciplines use the term engagement as a meta-construct to signify a variety of behavioral, affective, agentic and cognitive descriptions of how actively students are connected to their learning from the macro-scale (e.g., course level, school-level) to the micro-scale (e.g., moment by moment) (Fredricks,

Blumenfeld, & Paris, 2004; Sinatra, Heddy, & Lombardi, 2015). Azevedo (2015) called engagement "one of the most widely misused and overgeneralized constructs found in the educational, learning, instructional, and psychological sciences" (p. 84). Researchers have used the term engagement in place of motivational beliefs, emotional states, behavioral enactments of strategies, persistence, regulation, academic performance, classroom behaviors, interactions with instruction, and more.

To answer my research questions in this proposed study, I will focus on *behavioral* engagement as it relates to motivation. Adding behavioral engagement to this review and study captures an important motivation target that is observable and measurable. I do not review the research on cognitive engagement as that research has significant overlaps with other theories and extends into knowledge co-construction and regulated learning (Wolters & Taylor, 2012). I also do not review and include emotional engagement as it overlaps with subjective task value (Sinatra et al., 2015).

Behavioral engagement is the involvement in the academic task through actions including displays of effort, persistence, and behavioral aspects of attention (Sinatra et al., 2015). For example, Engle and Conant (2002) included the following behaviors in their measurement of engagement: students contributing to group discussion, low off-task behaviors, aligned body language, and persistence. Researchers have measured behavioral engagement using observations of students within the context of learning and psychological indices including eye-tracking, attention allocation, and response times (Greene, 2015; S. B. Nolen et al., 2015). Hijzen et al. (2007) measured group engagement by observing collaborative learning and coding the observations as either task-relevant or task-irrelevant behavior. Task-relevant behavior included when students were actively engaged, focused on the task, affectively involved, and persisting at

the task. Task-irrelevant behavior comprised of students being "off-task," giving up easily, not putting forth effort and apathetic.

In general, researchers conceive of behavioral engagement as a mediator between instruction and student achievement and a possible manifestation of student motivation and emotions (Wigfield & Guthrie, 2000). For instance, a learner with a developed interest in a subject is more likely to be behaviorally engaged and seek engagement opportunities (K Ann Renninger & Bachrach, 2015). Likewise, a student who is off-task is presumably bored, annoyed, exhausted, or distracted (Sabourin, Rowe, Mott, & Lester, 2011). However, not all engaged students are interested in the material (K Ann Renninger & Bachrach, 2015) and not all off-task students are bored, annoyed, or distracted. Therefore, measuring behavioral engagement can provide meaningful data about the groups' motivation, but it should not be the only measure. Of note, behavioral engagement should not be used as a manifestation of deep learning processes as one can be behaviorally engaged in lower order processing (Sinatra et al., 2015). Within collaborative learning research, behavioral engagement has been measured as a factor to relate to other factors of interest (Hijzen et al., 2007; Isohätälä et al., 2017). For example, Isohätälä et al. (2017) observed and coded for behavioral engagement and types of regulated learning at the group level. The authors found that increases in group behavioral engagement coincided with more negotiated and shared forms of regulated learning.

As engagement is a manifestation of motivation and emotions, researchers often employ it as a desired outcome or a proxy for motivational factors. In addition to students' motivational beliefs and cognitions, how students appraise the context is an important element of how and why groups reach engaged participation.

Context Appraisals

Researchers from across the cognitive and situative views of motivation have investigated how qualities of the context affect student motivation and regulation. What has emerged is the significance of students' appraisal of the learning situation (Boekaerts & Minnaert, 1999). Students appraise their learning context based on their knowledge and experience of optimal and suboptimal context features and motivational beliefs including goal orientations (Boekaerts & Minnaert, 1999).

Task appraisals. In collaborative learning, I believe student motivation and engagement will be afforded and constrained by students' appraisals of the task, the teacher, and their peers. Particularly for task appraisals, I will review theory and research regarding students' appraisals of task value, task cost, and task difficulty. Then I will review perceived teacher support and the literature on peer norms.

Subjective task value and cost. Students' perceptions of an academic task's value directly predict their choices (Wigfield et al., 2017). Researchers have accumulated evidence to show that task value predicts decisions to persist and choices of a student's career, college major, and course load (Wigfield et al., 2017). Although little research has been conducted on student groups' task value, task value may be an important component of how student groups engage in a group task.

The most prominent motivation theory to feature students' value perceptions is Eccles and colleagues' expectancy-value theory (EEVT) (Wigfield & Eccles, 2000) that has also been proposed as the expectancy-value-cost theory (K. E. Barron & Hulleman, 2015). The expectations component is accounted for in the review of competence self perceptions. As such, I will focus on the contribution of the value and cost components as seen in Figure 2.

Subjective task values are subjective because it is less important what students assign the absolute value of the task as much as it matters what they assign the value of the task in comparison of other alternatives (Wigfield et al., 2017). For example, a pharmacy student may value their leadership role in a co-curricular activity but because they have a test this week, their coursework holds a greater subjective task value. The subjective task value is determined according to students' perceptions of the cost-benefit ratio (Eccles, 2005). There are several types of costs and values.

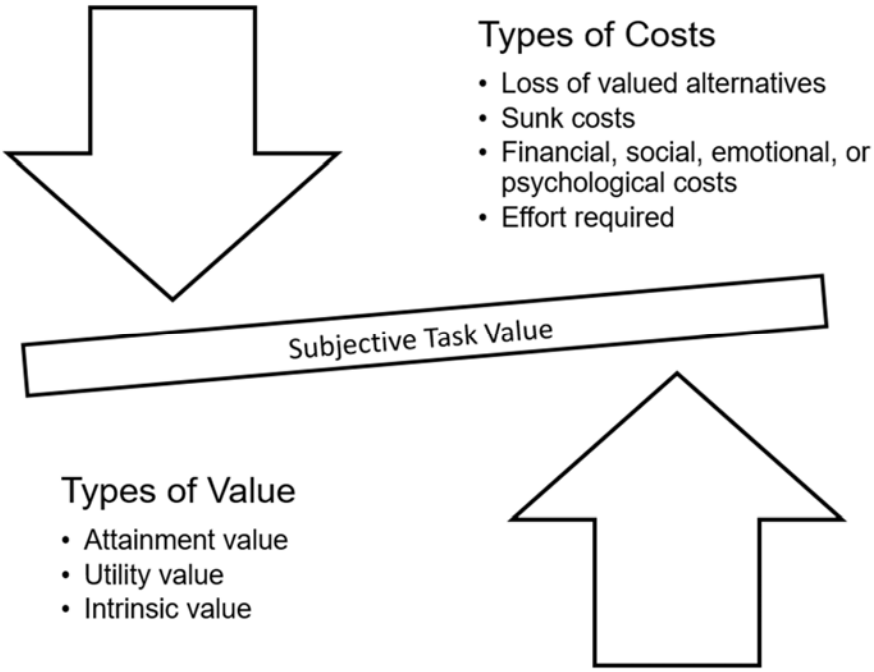

Figure 2. How Wigfield and colleagues (2017) depict the relationship between value and cost components.

The benefits of the cost-benefit ratio include attainment, utility, and intrinsic values. Students assign an attainment value to a task based on the relative importance of succeeding at a task (Wigfield et al., 2017). For instance, succeeding at a task could give the student a higher grade, which in turn, improves their chances of obtaining a residency program. It should be noted that attainment value overlaps with identity theories since students grant tasks higher attainment

value when they align with how they view themselves (Wigfield et al., 2017). Utility value is how the task fits into students' future plans and, as such, results in students asking, "will this be on the test?" and "will I use this in practice?" The utility value concept overlaps with performance goal orientation and extrinsic motivation yet the concept may also reflect a students' deeper goals such as attaining a future career (Wigfield et al., 2017). The enjoyment one gains from doing the task is called intrinsic value. Intrinsic value overlaps with theories of intrinsic motivation and interest.

On the other end of the cost-benefit ratio are different types of *costs,* which affect the overall value students place on the task and directly affects student achievement and choices (K. E. Barron & Hulleman, 2015). Costs include *opportunity costs,* which are sacrifices students make to complete the task. For example, to be on-task a student group must give up time spent socializing off-task. Also, students judge how much effort, money, time, and emotions a task will cost them (Eccles, 2005), as well as whether the task will affect their social standing with peers (i.e., *social costs*). Students also account for *sunk costs,* which are how much they have already committed to the task.

Researchers have viewed utility and value from mostly a cognitive perspective but also a situated motivation perspective (S. Nolen et al., 2009). Cognitive theorists of task value argue that it has direct effect on students' choices and performance and is also a mediator for competence self-perceptions, affective memories, and goal orientations (Wigfield et al., 2017). In contrast to the cause and effect perspective, situative theorists view task value as a joint negotiation between the individual students and the contexts (S. B. Nolen et al., 2015). In a study of preservice teachers take up of assessment practices, Nolen and colleagues described utility judgments as motivation filters. Students decided that material to learn and commit to memory

based on their utility filter (S. Nolen et al., 2009).

Students' choices based on their values involve both conscious and unconscious aspects (Eccles, 2005). Also, Eccles (2005) has proposed that student choices are usually influenced by others, but there is little research examining whether student groups negotiate perceptions of task value and costs at the group-level. In addition, developmental studies have shown that task values and costs change over semester and years (Wigfield et al., 2017), yet it is still not well understood how these change through co-construction mechanisms over a semester.

Task difficulty. Group tasks should provide optimal challenge and control over challenges to support engagement and invite episodes of regulation (Paris et al., 2001; N. E. Perry, 1998). Group tasks that are too easy are boring for students and do not require effortful regulation (Csikszentmihalyi, 1997; McCaslin & Hickey, 2001) whereas group tasks that are too difficult are inaccessible for learners, so they either invite withdrawal, resentment, or creativity with the allusion of adaptation (McCaslin & Hickey, 2001). Students perceptions of a task as too easy or too hard leads to disengagement (McCaslin & Hickey, 2001; Paris & Turner, 1994).

The purpose of creating optimal group challenges is to facilitate important *mediating processes* (Sandoval, 2013) with the understanding that optimal challenge is emergent, context dependent, and co-constructed by the individual and the greater social and cultural environment. Due to moderately difficult tasks, deep-level learning strategies may emerge from affective and cognitive motivational processes (McCaslin & Hickey, 2001). Tasks that students see as moderately difficult can increase arousal and produce "flow states" (Csikszentmihalyi, 1997; McCaslin & Hickey, 2001). Moderately difficult tasks can increase the likelihood that students engage with the material deeply because they assess the task according to the degree of challenge and the payoff of increasing their self-efficacy (Paris & Turner, 1994).

Teacher perceptions. Students are motivated to learn when they feel supported and cared for by their educators (Juvonen, 2006), The focus of education research on teacher-student relationships has been on K-12 students, especially in urban and socially disadvantaged schools. However, since there is much evidence suggesting that the teacher-student relationship matters, it is worth exploring in this study.

One important factor in research of student and teacher relationships is students' perceptions of their teachers' affective concern for them. Controlling for other motivation factors, Wentzel and Wigfield (1998), cognitive motivation researchers, revealed that students' perceptions of their teacher's caring predicted whether they participated in class and put forth the effort. Baumeister and Leary (1995) claimed that teacher caring contributes to students' feelings of belonging by teachers having frequent affective interactions with students in which they show affective concern for the students.

Group engagement is anticipated to be afforded by academic and emotional support by educators. In previous research (Wentzel, 1994; Wentzel & Wigfield, 1998), students' perceptions of a supportive social climate furthered group cohesion and use of collaboration skills. This result may be mediated by students' feelings of support and perceived relatedness with the educator that promotes student help-seeking (Brenner & Salovey, 1997; Newman & Schwager, 1993).

Peer appraisals. Students appraise their peers based on whether their peers adhere to socially constructed norms. Norms are behavioral expectations or values of a group (Hamm, Schmid, Farmer, & Locke, 2011). Peer group norms include how individuals should act in the group and what the social sanctions will be if they break the norms (Lapinski & Rimal, 2005). Group norms vary through a students' development, from elementary to adulthood, and across

different contexts (Hamm et al., 2011). In professional schools and the collaborative learning environment, it is unknown what the relationship is between engagement and peer norms. Fortunately, there is an expanding literature base in K12 education research that can explicate potentially significant constructs.

Behavioral norms is an aggregate, in this case, the groups', typical level of engagement (Bellmore, Witkow, Graham, & Juvonen, 2004). Essentially, students aim for acceptance by not visibly stepping out too much and following the typical behavior. Behavioral norms act as a contagion within the group (Juvonen & Knifsend, 2016). For example, when the majority of students are apathetic, it is risky for a student who is excited to visibly engage with content (Juvonen & Knifsend, 2016). In one study of behavioral norms (Fordham & Ogbu, 1986), the researchers described the experience of students labeled as "brainiacs" in middle school. As it was not the norm to act like a Brainiac, these students avoided exclusion from their peers by hiding the effort they put forth in school. Of interest, some of these students became proficient at managing their public image (Juvonen & Cadigan, 2002) and balancing their conflicting goals for achievement and social acceptance. These students have developed sophisticated social skills to maintain their academic engagement and their acceptance from peers.

In contrast to behavioral norms, *injunctive norms* are what students perceive to be an acceptable set of behaviors. Injunctive norms become more strongly related to behaviors as students' progress throughout their education (Hamm et al., 2011). It becomes less about behaving like the majority and more about behaving in a way the majority finds acceptable. In high school, academic engagement is not considered socially acceptable as it is negatively correlated with students' social prominent status (e.g., who is considered cool?) (Galván, Spatzier, & Juvonen, 2011). While the effects may be different in professional education, this

research is an example of how students' jockey for status by engaging in behaviors consistent with injunctive norms (Juvonen & Knifsend, 2016).

Summary of context appraisals. The majority of the reviewed research regarding student appraisals of the task, their teacher, and their peers have not been studied in the collaborative learning context. However, the effect these factors have individual motivation and engagement suggest that they may also affect group motivation and engagement. Of significant interest, is whether these appraisals behave as mediating processes between context features and student engagement in the task or regulation.

Thus far, I have reviewed how students' initial motivation beliefs, cognitions, and appraisals affect their individual and group learning processes. Theoretically, if a student group and all of its members have mastery and approach goal orientations, high competence perceptions, adaptive causal attributions, and positive appraisals of the context, then that group should not have difficulty initiating and sustaining their engaged participation. However, what about groups that have uneven motivational dynamics? How can their group members manage those members? Alternatively, how can groups reach engaged participation when the entire group wanes in their motivation or a motivational belief, cognition, or appraisal needs regulation?

Motivation Regulation

Wolters and Benzon (2013) defined *motivation regulation* as student "endeavors to manage their level of motivation or to purposefully sustain or improve their effort or persistence for academic tasks" (p. 200). In this regard, motivation is the target of motivation regulation that is being acted upon. For example, when a student has low motivation, they may regulate their motivation by using certain types of self-talk.

Before reviewing both individual and group level motivation regulation, it is necessary to understand regulation itself. Regulation occurs when students actively and strategically participate in cognitive, motivation, emotion, metacognitive, social processes to accomplish a goal and adaptively respond to environmental demands (Zimmerman & Schunk, 2001, 2008a). Additionally, regulation occurs when students construct adaptive regulation strategies to overcome *challenge episodes* or to reach a goal (Järvelä & Hadwin, 2013; Malmberg et al., 2015). When a learner fails to adapt to challenges, that is when the student does not regulate. There are several theoretical models of self-regulated learning (SRL) that differ in their theoretical origins, emphasis, phases, sub-processes, and contexts (Panadero, 2017; Puustinen & Pulkkinen, 2001). In Phillip H Winne and Hadwin (2008) information processing model of SRL, students regulate through dynamic cyclical phases comprising of understanding the task, setting goals and planning, enacting the task, and then performing large and small scale adaptations. Theorists do not view these phases as time ordered or causally connected; instead, students are thought to engage and re-engage in these phases cyclically and flexibly (Phillip H Winne & Hadwin, 2008; Wolters & Taylor, 2012). For example, a student may come back to creating a plan during task enactment.

Regulated learning is *metacognitive* (Hadwin et al., 2011). In basic terms, metacognition is thinking about the contents and processes of one's mind. It differs from *cognitive* processes based on the topic of the cognition. For instance, it is a cognitive process when a learner works through a math problem, but the student switches to a *metacognitive* process when they contemplate their cognitive strategy or determined whether it aided them in goal attainment. This is an example of metacognitive monitoring (Azevedo & Winne, 2015) that can then be considered regulation if the student then decides to control their current strategy. Therefore,

metacognitive monitoring can create opportunities for students to engage in regulation (Hadwin et al., 2011). A clear difference between metacognition and SRL is that metacognition only targets cognition whereas SRL also includes motivation and emotions (Dinsmore, Alexander, & Loughlin, 2008).

Individual motivation regulation. It is important to understand individual motivation regulation processes as the group-level research borrows concepts and processes from this more established research body. Researchers have applied Wolters (2003) model of individual motivation regulation to group-level motivation regulation research (Järvelä & Järvenoja, 2011; Järvelä et al., 2010). Wolters model originated from Pintrich and colleagues' model of self-regulated learning (Pintrich, 2000, 2004; Pintrich & De Groot, 1990). The model overlaps with models and literature in volition (Corno, 2001) and self-motivation (Cheng & Ickes, 2009). In this model, theorists view motivation as an area for regulation that occurs when students regulate low levels or quality of motivation. Wolters (2013) proposes three key facets of motivation regulation: metacognitive knowledge of motivation, monitoring of motivation, and control of motivation. Students metacognitive knowledge of motivation includes both the students' knowledge and beliefs about motivation (Boekaerts, 1996; Cooper & Corpus, 2009) and their declarative, procedural, and conditional knowledge needed to enact motivation regulation strategies (Wolters & Benzon, 2013). For example, students' metacognitive knowledge of motivation may include their belief that the topic is interesting or knowledge that creating self-based rewards and consequences will increase their persistence. When students become aware of their current state or quality of motivation, they are monitoring their motivation. This awareness can then lead students to control their motivation.

Students control their motivation through the application of *motivation regulation*

strategies (Alexander, Graham, & Harris, 1998). Students use strategies to regulate their motivation (Wolters & Benzon, 2013) by controlling their motivation beliefs, behavior, emotions, and environment (Wolters, 2003). For example, a student may think about reasons why the task is important when their motivation wanes. Motivation regulation strategies are strategies students purposefully use to maintain or supplement their willingness to provide effort and complete an academic activity (Alexander et al., 1998; Wolters & Benzon, 2013). Researchers often categorize strategies into different categories including environmental structuring, regulation of performance goals, regulation of mastery goals, self-consequating, regulation of value, regulation of interest and more (Wolters & Benzon, 2013). Environmental structuring strategies include limiting distractions, changing the setting, and studying at ideal times. Self-consequating includes promising oneself a reward for finishing academic work. For the regulation of either performance goals, mastery goals, value, and interest, these are motivation regulation strategies whenever students are purposefully reminding, convincing, thinking, connecting to, or making an effort towards these targets. For example, a student may purposefully connect the academic material to a future situation in which it would be useful to know the material. In a survey of college students, students most frequently reported environmental structuring strategies and performance goal based strategies compared to a less frequent reporting of task value, interest, or mastery goal based regulation strategies (Wolters & Benzon, 2013).

Motivation and motivation regulation share a complex and reciprocal relationship (Wolters, 2003; Wolters & Benzon, 2013). There is evidence that when students have positive task value and self-efficacy, they also apply more motivation regulation strategies (Wolters, 2003). However, the majority of researchers have focused on students' achievement goal

orientation. Students' goal orientations predict the type of motivation regulation strategies they use (Wolters & Pintrich, 1998) as students reporting a mastery goal orientation use a greater variety of motivation regulation strategies (Wolters & Benzon, 2013; Wolters & Rosenthal, 2000). However, the results have been mixed for a performance goal orientation. One study found a positive correlation (Schwinger, von der Laden, & Spinath, 2007) and another found nonsignificant and even, negative correlations between reports of performance goal orientation and the use of motivation regulation strategies (Wolters & Benzon, 2013).

Wolters (2003) predicted that motivation and motivation regulation share a curvilinear relationship. Theorists assume that students utilize motivation regulation strategies when they sense their motivation is waning (Wolters & Benzon, 2013). However, the regulation of motivation requires cognitive effort. Therefore students with less task motivation are unlikely to expend the energy to regulate their motivation. Wolters also suggests that when students have highly adaptive motivational beliefs, they may start the task with high levels of motivation and not face any obstacles that require motivation regulation. Hence, students with mid-range motivation are expected to regulate their motivation more than students with low or high motivation.

Students' use of motivation regulation strategies is also related to their use of cognitive and metacognitive regulation strategies (Wolters & Benzon, 2013). Theoretically, students might use the different types of strategies in parallel. For example, a student monitors and feels like their motivation is waning so that student creates a self-reward and simultaneously switches to a different cognitive strategy like self-testing. Alternatively, a student might use one strategy to target both a cognitive and a motivational challenge. For example, proximal goal setting is when students break up a large task into smaller segments. Wolters (1998) proposed proximal goal

setting as a motivation regulation strategy, but Bandura and Schunk (1981) proposed it as a cognitive regulation strategy. In experiments, this strategy increased students' self-efficacy, interest, and effort; yet it also guided students' thinking processes. Thus, the strategy can be used to improve either cognition or motivation. Wolters (2003) distinguished between the regulation type by focusing on what type of challenge the student was facing and what the student was targeting. If a student used a strategy to target their motivation; it is a motivation regulation strategy. If they used the strategy to facilitate cognition; it is a cognitive regulation strategy. To further this idea, the strategy may also be considered a combination if the student's goal also had a dual purpose.

Social regulation of motivation in collaborative learning settings. Hadwin et al. (2018) argue that successful collaboration depends upon three components: (a) individual self-regulation skills and strategies (*self-regulated learning (SRL)*), (b) transitional regulation support from one group member to another (*co-regulated learning (CoRL)*), and (c) shared regulation such as group awareness, shared motivation regulation, and coordinated strategies (*socially shared regulation of learning (SSRL)*). Authors have been conflicted in their use of these terms and other related constructs (Hadwin et al., 2018). For this paper, the differences between terms will be made according to distinctions in Panadero and Järvelä (2015) and Hadwin et al. (2018). I use social regulation as an umbrella term for SRL, CoRL, and SSRL in collaborative learning. Students regulate across the following four loosely sequenced feedback loops: (a) negotiate and construct shared task perceptions; (b) set goals and plans; (c) coordinate strategies and monitor progress; and (d) evaluate and adapt strategies.

As shown in Figure 3, Hadwin et al. (2011) based their model of SRL, CoRL, and SSRL on Phillip H Winne and Hadwin (2008) information processing model of SRL, McCaslin and

Hickey (2001) socio-cultural model of co-regulation (Hadwin, Wozney, & Pontin, 2005). Also, Hadwin et al. (2011) built the model from previous theories and fine-grained analyses of what successful groups do and say while learning together (B. Barron, 2000, 2003; Roschelle & Teasley, 1995).

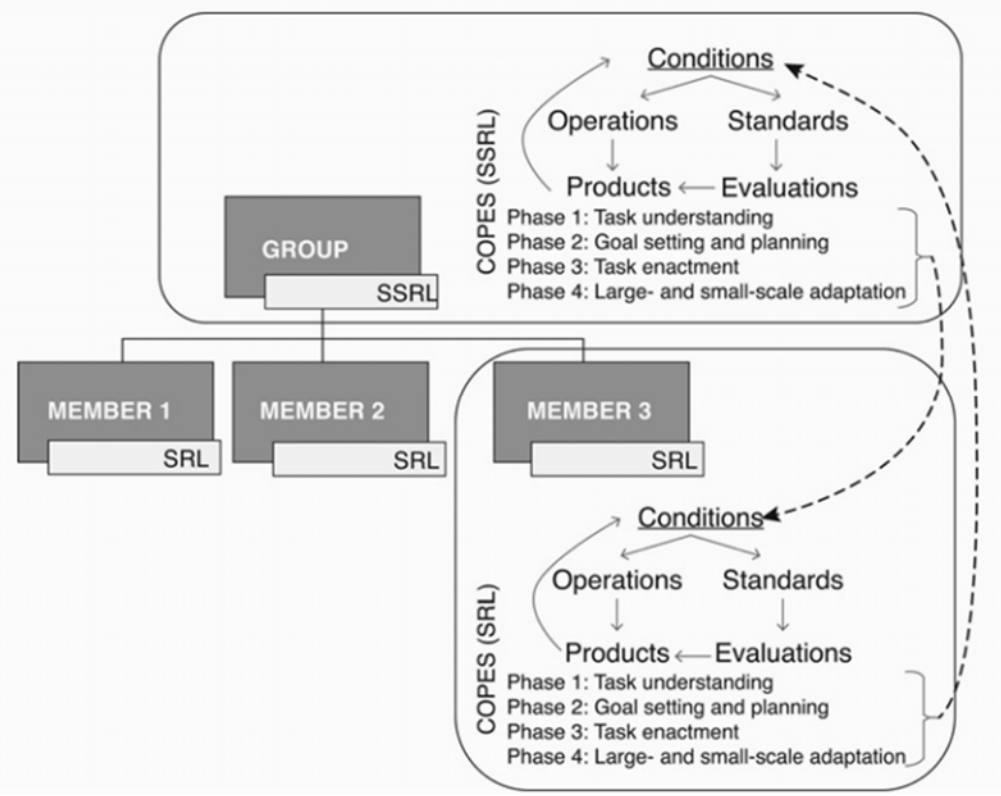

Figure 3: Hadwin et al. (2018) model of SRL, CO-RL, and SSRL in collaborative learning.

Extending the Phillip H Winne and Hadwin (1998) information processing model of SRL to small groups, Hadwin et al. (2011) proposed the key mechanisms underlying social regulation as conditions, operations, products, evaluations, and standards (COPES model). First, conditions are aspects that affect how students engage with the task (Phillip H Winne & Hadwin, 1998). In the Hadwin et al. (2011) model, conditions are separated into the following three classes: self conditions, task and context conditions, and group conditions (Hadwin et al., 2018). All three

classes of conditions are positioned as how an individual thinks about one of the three targets; themselves, the situation, or the group. *Self-conditions* are an individual student's self-perceptions, domain knowledge, beliefs, and experience (Hadwin et al., 2018). *Task and context conditions* include perceptions of situational affordances and constraints such as task difficulty, group size, or course expectations (Hadwin et al., 2018). *Group conditions* are what a student thinks about their other group members' and the overall group's ability, strength, and weaknesses (Hadwin et al., 2018).

According to Hadwin et al. (2018), conditions inform learner's standards; students' perceptions of the optimal end state of the phase. The criteria from students' standards are applied whenever students' monitor or evaluate the products (Phillip H Winne & Hadwin, 1998). The product is created by individual and group operations including performance, tactics, and strategies (Phillip H Winne & Hadwin, 1998). Group operations are characterized by co-constructing actions such as articulating, eliciting, integrating, and extending (Hadwin et al., 2018). Products are created after each stage (e.g., goals and plans) by operations. Products can consist of task perceptions, knowledge, strategies, or plans. Finally, either the educator or students individually or collectively evaluate products. These evaluations and products become the conditions for the group in the next stage (e.g., task enactment) as the evaluations can serve as metacognitive monitoring and trigger regulatory control.

Despite the Winne and Hadwin (1998, 2008) model being characterized as an information-processing model (Zimmerman, 2011), Hadwin et al. (2018) argued that it provides a nuanced account of situated and social phenomenon. Specifically, Hadwin et al. (2018) stated that including conditions in the model recognizes how situational features affect learning. The authors claim that the COPES architecture is a situative perspective of regulation. Next, I

overview the Hadwin et al. (2018) model theoretical constructs and research according to each level of regulation.

The measurement of SRL in group learning is still rare as group regulation is a relatively new area of research (Panadero & Järvelä, 2015) with mostly observational studies. In successful collaborative learning, individual students need to self-regulate towards group goals and regulate their thinking, beliefs, actions, and emotions (Hadwin et al., 2011). There is evidence that individual SRL leads to SSRL (Panadero, Kirschner, Järvelä, Malmberg, & Järvenoja, 2015). A study by Panadero et al. (2015) suggested that students with high self-regulated learning predicted more advanced group planning and strategies while students with high emotional regulation lead to greater group awareness of challenges. However, SRL, as measured in Panadero et al. (2015) study, did not predict group performance. This preliminary research suggested that SRL is a contributor to SSRL processes, but alone, does not predict group performance.

CoRL is when peers, instructors, or others guide, shape, or constrain an individual's or the group's regulatory activities (Panadero & Järvelä, 2015). For example, one student may question or prompt another student to recognize the discrepancies between their actions and the group's expectations which, in turn, causes that student to monitor and control this in the future (Järvelä, Järvenoja, Malmberg, & Hadwin, 2013). Overall, CoRL is a necessary process in collaboration as individuals need to occasionally regulate another individual's motivation, cognition, or emotions. However, if the group only has CoRL interactions, then this is not collaboration, but cooperation because the group is being dictated by individuals and does not come together to regulate the group as a whole (Järvelä et al., 2016).

SSRL emerges when individuals collectively share task perceptions, goals, plans, and

strategies (Hadwin et al., 2011). SSRL differs from knowledge construction based on the target (Roschelle & Teasley, 1995). When a student says, "what are our goals for this *patient*?" this student is conducting knowledge construction because the target is problem solving knowledge and skills. When a student says, "what are our goals for *today*?" this student is prompting SSRL because group goals are a part of the collaborative learning processes and task (Järvelä & Hadwin, 2013). SSRL includes knowledge of and thinking about the group's cognition, motivation, and emotions (Järvelä & Hadwin, 2013). During SSRL, a group with a shared outcome interdependently shares in regulatory processes, beliefs, and knowledge usually embodied in shared strategies, monitoring, evaluation, goal setting, motivation, and metacognitive decision making (Panadero & Järvelä, 2015). SSRL is more advanced then group members simply sharing a goal, for example. SSRL would only occur if students co-constructed and negotiated an agreement for a goal (Hadwin et al., 2018).

In collaborative learning research, research on regulation is still minor in comparison to cognitive processes (Panadero & Järvelä, 2015). Social regulation studies have been conducted in a range of contexts from primary education to professional education (veterinary students) with the most common context being *computer-supported collaborative learning* (CSCL) because technology assists in the data collection of social exchanges (Järvelä & Järvenoja, 2011). Initial research has shown that SSRL leads to deeper level strategy use (Järvelä et al., 2013), higher group performance (Janssen, Erkens, Kirschner, & Kanselaar, 2012; Volet et al., 2009), and decreased feelings of task difficulty (Hurme, Merenluoto, & Järvelä, 2009). Most studies use video research to characterize SSRL processes or Design-Based Research (DBR) to study the interactions resulting from a designed intervention. Thus far, researchers have not conducted quasi-experiments or experiments on these interventions as much of this research is in the

beginning phases. Despite the current lack of substantial evidence for improved learning outcomes for social regulation, the emerging research has revealed promising insights into the regulation challenges students face in collaboration and how high functioning groups behave compared to low functioning groups.

Motivation challenges. What defines social motivation regulation is a groups' ability to overcome challenges in their engagement and motivation. Hadwin, Järvelä, and Miller (2011) defined challenge episodes as situations when students are stalled or confront problems. These challenges create opportunities for regulation processes and the use of regulation strategies (Hadwin et al., 2011). Within the group, students enter collaborative learning with different priorities, expectations, and emotional well-beings (Rogat et al., 2013; Volet & Mansfield, 2006). Disagreements between group members, especially when arguments are positioned as "I am right, and you are wrong," can lead to disengagement of one or several of the group members (Darnon et al., 2006). Motivation waxes and wanes whenever students perceive personality conflicts and poor communication interactions (Järvelä et al., 2010). Also, students are challenged to coregulate others' motivation. For example, Volet (2006) described business students with a performance goal orientation who decided to complete most of the groups' work because they struggled to regulated others' motivation. These performance minded students said they would rather "do extra work than rely on others" (p. 351). Outside of the group dynamics, groups' motivation may wane due to receiving a poor grade, a distraction from the environment, or conflicts from outside hurdles (Järvenoja & Järvelä, 2009).

Measuring challenge episodes. Currently, social regulation researchers are impeded by available tools to measure and identify challenge episodes. Previous researchers used student groups' self reports of challenges (Malmberg et al., 2015) but these measures are off-line

(Schraw, 2010). Offline measures consist of measurements before or after the learning episode so students may not remember the moment by moment challenges they experienced (Schraw, 2010). Online measures, in contrast, are taken during the primary learning episode and can include think-aloud protocols, trace logs, and observations (Philip H. Winne & Perry, 2000). A promising future approach for social regulation research is to triangulate offline reports of group challenges with an online measure, observation.

Although social regulation researchers have not coded for observed group motivation challenges, in a related field of student motivation, conflict regulation researchers have identified a similar concept through observation called "threats" (Butera & Darnon, 2017). In conflict regulation research, researchers detect threats as a result of the produced outcomes (Tesser, Millar, & Moore, 1988). The outcomes of threats are determined by empirical evidence and theory. For example, researchers aid their inference of threats whenever they observe attention impairment (Butera & Darnon, 2017). Researchers in conflict regulation argue that disagreements between group members affect group engagement because it leads to members assessing their own and other's level of competence. Disagreements between members can cause social comparison threats and self-evaluation threats (Muller & Butera, 2007). These threats occur when an individual fails to reach their expectations and, because they aim to preserve their self-worth, they will regulate the situation to maintain their positive self-evaluation (Butera & Darnon, 2017). Muller and Butera (2007) theorized that self-evaluation threats produce contemplative thoughts that steal students' focus on the task at hand.

Considering the work of Butera and Darnon (2017) on threat detection, social regulation researchers should also utilize theory and empirical evidence of what follows a challenge episode. I think it is appropriate to infer a challenge episode has occurred if it is proceeded by

inattention, regulatory statements, or regulation strategies. As evidence, Ucan and Webb (2015) conducted a qualitative analysis of how social regulation episodes emerge. The authors described three themes for how shared emotion and motivation regulation processes emerged: (a) experiencing different priorities in relation to the task; (b) failing to reach a consensus on a shared understanding; and (c) displaying disruptive behavior during the activity. All three of these themes can be classified as regulation challenge episodes. While judging challenge episodes that the group does not regulate requires more inference, it is reasonable to assume a challenge episode has occurred if it is direcly followed by a regulation process.

Social motivation regulatory statements and take up. Social motivation regulation begins when a student consciously responds to a group motivation or engagement challenge episode by attempting to regulate their, their peer's, or the group's motivation and engagement. Depending on the level, take-up, and outcome of the student's attempt to regulate motivation and engagement, the *regulation type* is defined as either individual motivation regulation, motivation co-regulation, socially shared regulation of motivation, or failed regulation. Unfortunately, Hadwin et al. (2018) thoroughly illustrated that previous researchers are confused about the differences between these concepts, especially the meaning of co-regulation.

In response, I created Table 4 to achieve the following: be explicit about differences in level; partition the processes into statements and group take-up; and divide co-regulation into co-regulation of a peer and co-regulation of the group. The motivation *regulation types* are defined according to which level students' statements reside and how the rest of the group takes up the regulation statement (Hadwin et al., 2018; Isohätälä et al., 2017; Malmberg, Järvelä, & Järvenoja, 2017). For example, if a group member says, "this is overwhelming, let's break up the task into pieces," then this phenomenon is either *motivation coregulation of the group* or *socially*

shared motivation regulation depending on how others take up the statement. If group members nod their head in agreement, then it may be *motivation coregulation of the group*. Alternatively, it would be *socially shared motivation regulation* if other group members took up the statement by elaborating on how they could specifically break up the task.

Table 4

Social Motivation Regulation Types Defined by Levels of Statements, Take-up, and Outcome*

Regulatory Type	Level of the regulatory statement	Peer or group take-up	Outcome
Individual motivation regulation	*Level: Self* Clear expression of the wording "I"	Not applicable	Not applicable
Motivation coregulation of a peer	*Level: Peer* Implied or expressed "you"	*Peer Take up:* The peer either agrees or elaborates on the statement.	The peer's individual motivation regulation is supported or thwarted
Motivation coregulation of the group	*Level: Group* Implied or expressed "we"	*Group Take up:* Other group members agree. They echo the same idea, but they do not add anything new to the conversation	The group's motivation regulation is supported or thwarted
Socially shared regulation of motivation	*Level: Group* Implied or expressed "we"	*Group Take up:* Other group members agree, but they also complement and bring new and additional information to the conversation	Not applicable

Note: *Motivation includes behavioral engagement, interest, motivation beliefs, motivation knowledge, and processes of motivation constructs

Regulatory statements are a piece or coding node of regulatory processes. For example, motivation co-regulation process consists of (a) an initial regulatory statement, (b) followed by

take-up or lack of take up by others, and (c) then results in an outcome of either an individual's or the group's regulation being supported, thwarted, or unchanged. Emerging research (Isohätälä et al., 2017) contains measurements of the first two steps and ignores the last step in order to improve construct reliability. The outcome of a regulatory statement cannot be reliably observed because it may occur mentally, in the future, or it is impossible to predict. For instance, if one student says, "It is not that hard" in response to another student struggling, it is difficult to determine whether this supported or thwarted that individual's *motivation regulation*. Of note, it is less problematic to determine if the one student's statement immediately affected the other student's *motivation and engagement*.

I formulated the motivation regulation facets in Table 5 from individual motivation regulation research (Boekaerts, 1996; Wolters & Benzon, 2013) and socially shared regulation of learning theoretical constructs (Hadwin et al., 2018). For example, Boekaerts (1996) theorized that individual students create a mental representation of their behavioral intention. Expanding on this concept, one can imagine how a group may set a goal for high behavioral engagement, sustained interest, and a performance mindset. Of the five facets, researchers have only investigated the enactment of social motivation regulation strategies in collaborative learning (Järvelä & Järvenoja, 2011).

Table 5

Description of Social Motivation Regulation Statements*

Motivation Regulation Facets	Description	Example	References
Create a motivation intention	Students create a mental representation of their behavioral intention	"Lets really maintain our focus for the next hour"	(Boekaerts, 1996)
Construct meta-motivational knowledge	Building students' knowledge or beliefs about motivation or their declarative, procedural, and conditional knowledge needed to enact motivation regulation strategies	"I heard that taking planned breaks helps motivation in the long term" "Another student said this assignment was really interesting"	(Hadwin et al., 2018; Wolters & Benzon, 2013)
Monitoring motivation state, beliefs, or knowledge	Observing current motivational states, beliefs, or knowledge	"I think we are mentally exhausted" "It seems like you don't like this topic"	(Hadwin et al., 2018; Wolters & Benzon, 2013)
Intentionally enacts a strategy to overcome a motivation challenge	One person intentionally enacts a strategy to overcome a motivation challenge	"What if you tried thinking about how you are going to use this in the real world?"	(Hadwin et al., 2018; Järvelä & Järvenoja, 2011; Wolters & Benzon, 2013)
Reflect on motivation state, beliefs, or knowledge	Judging past motivation states, beliefs, or knowledge	"Yeah, but I think we were tired by our math exam last week"	(Hadwin et al., 2018)

Note: *Motivation includes behavioral engagement, interest, motivation beliefs, motivation knowledge, and processes of motivation constructs

Social motivation regulation strategies. Järvelä and Järvenoja (2011) adapted (Wolters, 2003) individual motivation regulation strategies to create the following categories of group motivation regulation strategies: task structuring, social reinforcement, efficacy management,

interest enhancement and socially shared goal oriented talk. For this review, I have expanded on Järvelä and Järvenoja (2011) categories by aligning each one to a theoretical basis, updating the list with recent literature (Wolters & Benzon, 2013) and adding categories for attribution manipulation and value regulation (see Table 6). As motivation and engagement are broad encompassing constructs, there are likely a variety of strategies students use to overcome challenges in motivation and engagement (Wolters & Benzon, 2013).

Table 6

Descriptions of Social Motivation Regulation Strategies from the Social and Individual Motivation Regulation Literature

Social Motivation Regulation Strategy	Description	Examples	References
Task and environmental structuring	Students decrease the possibility of off-task behavior or impaired ability by structuring the task or environmental conditions.	Meeting in a quiet meeting room to limit distractions	Corno, 1993; Jarvela & Jarvenoja, 2011
Group handicapping	Students protect self-worth by creating obstructions before or during a task to make it more difficult. This gives them the possibility to attribute the likely outcome to the obstruction.	Effort avoidance, procrastination	Boekaerts, 1996; Jarvela & Jarvenoja, 2011; Midgley & Urdan, 2001
Social reinforcing	Students are delivering extrinsic reinforcements to influence motivation and engagement.	Social comparison, punishments, rewards	Jarvela & Jarvenoja, 2011; Ryan & Deci, 2000a
Competence perceptions management	Students ability to regulate their expectations, outcome expectancies, or self-efficacy for a task.	Outcome expectancy regulation, efficacy self-talk, proximal goal setting	Jarvela & Jarvenoja, 2011; Marsh et al., 2017; Wolters & Benzon, 2013

Interest and intrinsic motivation enhancement	Students aim to increase immediate enjoyment or situational interest during a task	Making it a game, creating novelty, bringing in snacks	Jarvela & Jarvenoja, 2011; Renninger & Hidi, 2011
Regulation of performance goals	Students manage their reasons for completing the task towards outperforming others.	Affirming the importance of grades	Elliot & Hulleman, 2017; Wolters & Benzon, 2013
Regulation of mastery goals	Students manage their reasons for completing the task towards learning the material.	Students persuade each other to keep learning	Elliot & Hulleman, 2017; Wolters & Benzon, 2013
Task value regulation	Students either positively managing task value and costs to increase motivation or engagement or negatively managing task value and costs to protect self-worth, especially after poor performance.	Affirmations, reframing effort, creating relevancy	Wigfield et al., 2017; Wolters & Benzon, 2013
Attribution manipulation	Students purposefully selecting causal attributions to maintain or increase their motivation for a task	Attributing poor outcome to uncontrollable factors (e.g. teacher)	Weiner, 1985; Wolters & Benzon, 2013

The accurate measurement of regulation strategies. In the current social regulation literature, one of the largest measurement challenges is deciding whether students' enacted strategies were intentional or not. An assumption of regulation theories is that students have agency. Students create goals and intentions not always aligned with the task or teacher (Hadwin et al., 2018). Strategies can only be called regulation strategies if the learner was consciously enacting the strategy to overcome a perceived challenge (Boekaerts, 1996; Hadwin et al., 2018). If students enact a motivation strategy automatically and unconsciously, then this is not regulation, but a motivational process (Boekaerts, 1996). Hadwin et al. (2018) claimed that identification of strategies is almost futile without knowledge of learners' intentions. The authors recommend the field move beyond solely analyzing observational data and triangulate it with data about learners' intentions and beliefs (e.g., self-reports).

As Hadwin et al. (2018) argued that previous social regulation research contain low specificity for measurements of regulation constructs, researchers should aim to decrease the measurement aperture and be more specific than previous research on what will be considered a regulatory process and strategy. In previous research on regulation, researchers have been overly liberal on what is considered regulation, most likely capturing *knowledge construction* and labeling it as regulation (Hadwin et al., 2018). Also, cognitive strategies have been overly labeled as regulation strategies because researchers do not link them to learners' intentions or identified challenge episodes (Hadwin et al., 2018).

Summary of motivation regulation processes. Similar to the reviewed motivation theories and research, the research on motivation regulation has dominated studies of individual learning. However, there is an emerging field of social regulation research that has characterized what motivation regulation challenges groups face and the strategies they use to overcome these

challenges. Questions remain regarding how motivation regulation emerges and how groups differ in their motivation regulation processes. Also, the group motivation and group motivation regulation literatures have remained isolated from each other. Future research should explore the relationship between motivation and motivation regulation within collaborative learning groups.

Conclusion

The reviewed literature has shaped the predetermined list of targets and sub-targets for this study as well as how these factors will be defined, measured, and reported (see Appendix). In the end, this review also signifies the lack of research on motivation and engagement in collaborative learning, but the potential for studying a range of constructs and processes. To this point, an exploratory study is a necessary first step to identify the most significant processes for motivation in collaborative learning as the number of potential factors is too large.

CHAPTER 3: METHODS

The purpose of this study was to describe two extreme case studies of student project groups and then explore differences between the two case studies in terms of motivation co-construction mechanisms and the following motivation targets: 1) motivational beliefs and cognitions, 2) group behavioral engagement, 3) students' appraisals of the context that afford or constrain motivation and engagement, and 4) motivation regulation. This study will contribute to basic research about the fundamental knowledge and theory of collaborative learning groups' motivational processes.

The research questions for this study were as follows:

R1: What types of motivational beliefs and cognitions, group behavioral engagement, context appraisals, motivational challenges, and motivation regulation emerge in two extreme cases of collaborative learning groups?

R2: In a group who rated their motivation as high and another group who rated their motivation as low, what types of mechanisms emerge to co-construct their motivational beliefs and cognitions, group behavioral engagement, context appraisals, and motivation regulation?

R3: What differences exist in motivational beliefs and cognitions, group behavioral engagement, context appraisals, and motivation regulation between groups who rated their motivation as high compared to groups who rated their motivation as low?

To answer the research questions, I conducted a qualitative within-case and cross-case analysis (Miles, Huberman, & Saldana, 2013) of two extreme cases (Patton, 2015) of collaborative learning groups and the individual members within these two groups. The two

cases were retrospectively selected from a data corpus of an overarching DBR (McKenney & Reeves, 2013) project. The aims of the DBR project were to design and test a mobile-friendly website, Collabucate, to foster social regulation and teach students collaboration skills during their experience in project-based learning environments. This study utilized data collected from the first cycle of design and testing of Collabucate completed in the Fall of 2016.

Qualitative methods are a common approach to study "how" and "why" research questions in collaborative learning research (Hmelo-Silver et al., 2013). In contrast, quantitative methods have been used in experimental and non-experimental approaches to confirm or explore broad, generalizable hypotheses (Cress & Hesse, 2013). Also, qualitative research is useful whenever no acceptable, valid, and reliable quantitative measures exist. Currently, many motivation measures exist for individual-level student motivation, but there are few quantitative measures for peer or group level motivation, motivation regulation, and engagement. Qualitative studies can contribute to future study hypotheses and build the growing knowledge of an unknown phenomenon.

Within cross-case analysis methods, there are two different approaches; either a variable-orientated approach or a case-orientated approach (Ragin, 2014). A variable-orientated approach includes casting a wide net over a large number of cases, foregrounding the variables and their interrelationships. As the cases are in the background of the analysis, case-to-case comparison is more difficult. When researchers use a case-orientated approach, they first consider each case as a whole and then conduct a comparative analysis of a small number of cases. Each approach is not better or worse than the other but affords different advantages or disadvantages. The role of the researcher is to intentionally select between them and be open to integrating or alternating between them during data analysis if the need arises (Miles et al., 2013).

I employed a case-orientated approach to the study of two extreme collaborative learning groups for several reasons. First, conducting a cross-case analysis of two extreme collaborative learning groups is a common approach in the collaborative learning literature when researchers are studying underexplored phenomenon (Bakhtiar, Webster, & Hadwin, 2017; Hijzen et al., 2007; Näykki, Järvelä, Kirschner, & Järvenoja, 2014). In qualitative research, sampling is theory driven and should be based on previous research of which events yield the richest data (Miles et al., 2013). For example, students may discuss their motivation beliefs more often in the first ten minutes of group work, after an assessment, or the last working session. However, the field of group motivation and motivation regulation is not advanced enough to determine with confidence which events yield the highest return of group motivation data. As I studied all of the available group events, a contribution of this work was informing future variable-orientated studies of which group events yield the richest group motivation data.

Second, selecting two cases has the advantage of resulting in a thick description of what happened in two single bounded contexts (Miles et al., 2013). Alternatively, if several cases were sampled and the variables were added up together, then this would "destroy the local web of causality and result only in a smoothed-down set of generalizations that may not apply to any specific case in the set – let alone the others" (Miles et al., 2013, p. 99). Therefore, an in-depth case analysis has the potential for unlocking fundamental connections in each case, thereby telling the full story of each project group. Group motivation is so labile that a single talk turn can affect group engagement. Hypothetically, a group member could exclaim, "I give up!" and the other group members lose momentum.

Third, by comparing across the two case studies, this approach adds confidence to the findings and deepens the understanding of the findings. Evaluating similarities and differences

between cases increases the chances of finding negative cases, which, in turn, strengthen theory (Miles et al., 2013). Also, differences between cases may reveal insights that were not visible before the cross-case analysis.

In addition to using a case-orientated approach, I took a *microgenetic* approach (Chinn & Sherin, 2015) to data selection and data analysis. Microgenetic methods comprise of detailed, in-depth accounts of how learning unfolds, step by step. Siegler (2007) characterizes microgenetic analyses by the following three essential criteria: observations of changing competence over time, the density of observation is enough to detect change, and the analysis is in-depth enough to infer processes that gave rise to the observations. By taking a microgenetic approach, I was able to capture how motivation constructs emerge, sustain, or are thwarted.

Participants and Study Context

Approval for the DBR Collabucate study was given by the UNC-CH Institutional Review Board (Study No.: 16-2377). The participants were second year doctorate of pharmacy students who worked in groups of four to five in a project-based learning environment. Six groups were recruited, totaling 29 students. The class size was 150 students with 25 of the 150 students residing in a satellite campus. Students in the satellite campus were not enrolled in this study.

Participants. Participants were recruited from a required course in pharmacy school. The purpose of the course was to prepare pharmacy students to solve complex pharmacy practice problems, innovate, and lead change. The course was one semester long and met twice weekly for two hours each session. The course consisted of lectures, case-based learning, and project-based learning. This course was selected to implement Collabucate since about half of students' effort was spent on the project-based learning component. The first half of the course consisted of the lectures and individual assignments of case-based learning (Kolodner, 2014). Then the

remainder of the course comprised of student groups working on the project-based learning assignment. In the course, the researchers' involvement included the following: 1) design and implementation of the Collabucate intervention; 2) study recruitment and implementation; 3) occasionally consulting with the course director on other related course components (e.g., the frequency of group meetings); and 4) delivery of a two-hour in-class workshop on team building principles.

Student groups were recruited through an announcement made by the researchers during a class session in the course. Enrollment into the study required consent from all members of the student project group. Student groups were enrolled in the study in a rolling "first-come-first-serve" basis until six groups were reached. For enrolling in the study, students were rewarded with two lunches and a $25 gift card. Also, each group was granted a private group work room. To enroll in the study, students agreed to 1) use the Collabucate web app prototype twice a week; 2) have group sessions video-taped; and 3) participate in end of the semester focus groups.

Group project-based learning task. The focus of the study was the group project-based learning assignment. The task was six iterative group assignments in which students were asked to work together to a propose a solution to a large, real-world pharmacy discipline problem topic. The groups in this study were all assigned a different problem topic. In this study, I do not describe the problem topic areas the groups were assigned, because it could lead to the identification of the research participants.

The assignments were as follows:

- Identify and define the problem; analyze the problem (group paper)
- Formulate possible solutions (group paper)
- Evaluate these solutions (group paper)

- Defend the best solution (group paper)
- Written final proposal (group paper)
- Oral final proposal (group presentation)

The first four group assignments were designed to guide students through the problem-solving process. After each assignment, professors provided the student groups with written formative feedback on their work products. By design, the students were to take this feedback, revise, and formulate the final written and oral proposal with this feedback in mind. This course was aligned with the six key features of project-based learning: a driving question, learning mastery goals, student engagement in scientific practices, collaborative activities, scaffolding with learning technologies, and creation of a set of tangible products (Krajcik & Blumenfeld, 2006). Student groups completed their projects during several sessions of unstructured time. Groups could meet twice a week for two hours with scheduled mentor guidance. The final oral presentation was a 15-minute group presentation about the groups' assigned problem and their recommended solutions.

Course assessment is a known affordance or constraint of student motivation (Ames, 1992). Therefore, the course and task assessment served as an important context for the proposed study. The group assignments made up 50% of each students' final course grade. Each student was either given a High Pass grade (90% total course points), Pass grade (70-90% total course points), or Failing grade (less than 70% total course points). These grading standards may have provided a unique motivation challenge since students were accustomed to being assessed on an A, B, C, and D scale and may have perceived the High Pass, Pass, Fail scale as less strenuous. This type of context was ideal to study students' motivation regulation because every student was presented with this identical motivation challenge and may have differences on whether it

was regulated and how. From my observations, I would infer that students only went above expectations in this course due to their personal interest, desire for a non-traditional pathway, a goal of getting a high pass, enjoyment of collaborative learning, or desire to look smart in front of their cohort during the final oral presentation. For the remainder of students, they talked about how this course was an obstacle to pass through or around to complete their other goals. Researchers were not involved in assessing students' products and did not collect student products or grades because the first cycle of this DBR study was focused on implementation, mediating processes, and student perceptions.

This course was also selected for Collabucate implementation, because in previous course evaluations, students stated they struggled to manage their group work while proposing solutions to the complex and ill-structured problem. My collaborator and I thought this was the best context to implement an intervention because challenging tasks provide opportunities to study student regulation. Group tasks should provide optimal challenge and control over challenges to support engagement and invite episodes of regulation (Paris et al., 2001; N. E. Perry, 1998). Group tasks that are too easy are boring for students and do not require effortful regulation (Csikszentmihalyi, 1997; McCaslin & Hickey, 2001) whereas group tasks that are too difficult are inaccessible for learners, so they either invite withdrawal, resentment or creativity with the allusion of adaptation (McCaslin & Hickey, 2001). This particular group task was challenging enough for students because it asked students to solve existing real-world problems, yet it was not too challenging since students were able to work in groups and the task guided the students through a problem solving process.

The project-based learning occurred in the small-group rooms. Students worked together around a half moon desk focused on a shared monitor. The students could connect their laptops

to the shared monitor and work collectively in a shared space. The setting followed design models of active and collaborative learning spaces (Souter, Riddle, Sellers, & Keppell, 2011).

In this course, small groups were formed according to students' preference for the topic problem (e.g., patients forgetting to take their medications). Forming the groups in this way afforded student engagement by supporting students' personal interests (K. Ann Renninger & Hidi, 2011) and need for autonomy (Minnaert, Boekaerts, & De Brabander, 2007; Ryan & Deci, 2000b). By not allowing students to group with their friends, the students were challenged to work successfully with unfamiliar students. The groups varied in the make-up of their academic backgrounds, previous experiences with their topic problem, and problem-solving ability.

Direction instruction on collaboration skills. The direct instruction of collaboration skills is another notable contextual aspect of the course. Another graduate student and I conducted a two-hour long team building workshop for the course. The workshop included three class activities. In the first activity, we presented a commonly utilized team development model (Tuckman, 1965) that suggests high performing teams progress through the following four phases: forming, storming, norming, and then performing. Students watched relevant clips from the movie "Remember the Titans" and then were asked to apply concepts from the Tuckman (1965) model to problems they experience in group work. In the second activity, we asked students to work in their assigned groups to create a team resume. On the team resume, students wrote their combined years of education, work experience, background in course content, and personal interests. Students learned about their group members' backgrounds and considered how a team has so many more skills and experiences to draw from than an individual. In the last activity, students participated in a Send-a-Problem (Barkley, Cross, & Major, 2014) activity. We took the common problems outlined in the Poll Everywhere® question and asked students to

work in groups to derive strategies for overcoming each problem. For example, in response to "unequal participation," a student group wrote, "set individual and group goals." The combined results of the exercise were organized and emailed out to students after the workshop.

Collabucate data source. Whereas the effects of the Collabucate intervention are not the focus of this study, the log data (i.e., student input data) from Collabucate were leveraged in group selection and used in the data analysis as described later in this chapter. Also, Collabucate is an important context that may have afforded or constrained the groups' motivation processes, motivation regulation, or engagement. The design of Collabucate was modified from the following group scripting and awareness tools; S-REG (Laru, Malmberg, Järvenoja, Sarenius, & Järvelä, 2015), OurPlanner, and OurEvaluator (Järvelä et al., 2015), and the Individual Reflection Tool (Miller & Hadwin, 2015). These tools were designed according to three design principles proposed by Jarvela and colleagues (2015): awareness, externalization, and prompting. The tools support individual group members awareness through dashboards. They ask students to externalize their cognitive, motivation, and emotional challenges working with their groups. Then the tools prompt individuals and the group to regulate group behavior, thinking, motivation, and emotions.

We designed Collabucate by applying Järvelä et al. (2015) three design principles and our own proposed fourth design principle: explicitly teach students collaborative learning strategies. Research on individual self-regulated learning supports our proposed design principle. Researchers (Kistner et al., 2010; Pintrich, 2002) argue for the benefits of teaching metacognitive knowledge, regulation processes, and strategies. Explicit instruction of strategies has been a successful approach in fostering individual self-regulated learning (Zepeda, Richey, Ronevich, & Nokes-Malach, 2015). Specifically, students benefit from instruction in the what, when, why,

and how knowledge of individual learning (Donker, de Boer, Kostons, van Ewijk, & Van der Werf, 2014; M. V. Veenman, Van Hout-Wolters, & Afflerbach, 2006). In Table 7, I included the resulting section and components for Collabucate.

Table 7

Collabucate Web App Sections and Components Accessible by Users

App phases	Design components	Features and process
	Assess (Individually completed on Tuesday each week)	
Tool and strategy evaluation	Tool assessment questions	Ratings of the previous week strategy according to usefulness, understanding, and implementation
Self-reflection and evaluation of self and group	Self- and group-assessment questions	Self and group assessment of the current level and sources of group functioning, motivation, and emotions
	Strategy (Individually completed Thursday each week)	
Social-awareness	Comparative dashboard	Compares individuals' ratings to the groups' aggregate and anonymous ratings
Strategy teaching	Content delivery of a group strategy	Generation of a personalized group strategy based on the most salient group challenge Teaching of the "what," "how," and "why" of the strategy
Self-awareness and individual evaluation	Assessment questions	Asks students to evaluate whether their group has conducted
Individual planning	Fill-in-the-blank question	Ask students how they would implement this strategy in their group
	Progress (Accessible anytime)	
Social awareness	Graph	Students can track their groups' trends in cognitive, motivational, and emotional ratings

Note: Each week for eight weeks, students interacted with Collabucate according to this table

During the Fall of 2016, 29 students in six groups individually completed Collabucate submissions twice a week for eight weeks. Each Tuesday the study participants assessed themselves and their team on cognitive, motivational, and emotional aspects of group work. For example, students were asked to rate their groups' current level of motivation on a scale from zero to one hundred. Then each student was asked to select an area of improvement in the domain of motivation from one of the following suggestions: our interest in the task; lack of goal setting and tracking; believing we will do well; lack of focus or commitment; and differences in goals, priorities, and expectations. Each Thursday, student individually returned to the app to view the dashboard. Included in the dashboard was a comparison between the individual students' rating of the group motivation and the rating of group motivation made by the remainder of the group. Also, the dashboard included the groups' most salient group challenge (e.g., time management) and a corresponding group strategy (e.g., group time management tips). Out of the thirty possible group strategies, ten were related to improving group motivation. The group motivation strategies included "Create Your Own Excitement," "Break up the Task," "Set Group Goals," "Improve Focus," "Create Group Rewards," and more. As an example, if one groups' members all rated "Believing we will do well" as a challenge, then this group would receive "Break up the Task." Then Collabucate would guide individual group members through tips on how to break up the task, compare and contrast how effective and ineffective groups break up the task, and then prompt each student for how they will break up the task. During this implementation, it was possible for one group to receive a motivation strategy every week and another group to receive only cognitive group strategies.

Data Collection

In this proposed study, I utilized observational video data and Collabucate log data

collected in a previous study to answer the proposed research questions. In the previous study, a large corpus of video data was collected in the fall semester of 2016. The six volunteer student groups were filmed during class group working sessions over the course of a semester. The six groups each had 10 group working sessions lasting two hours for a total of about 120 hours of video tape data. Video data were collected from video cameras attached to the back wall where student groups were meeting. As audio back up, audio recorders were also placed on each student work table.

Data selection. Extreme case sampling was used to purposefully select two maximally contrasting cases of project groups in terms of individual members collective perceptions of their groups' motivation (Patton, 2015). The aim was to identify illuminative and information rich group cases with useful variation in motivation processes. Extreme case sampling limits generalizability of the data, however, representation was not an aim of this study.

In previous similar research, researchers determined the extreme cases by initially analyzing all of the data and subjectively judging which groups were high and low functioning (Bakhtiar et al., 2017; Hijzen et al., 2007). In this study, I utilized data from Collabucate to inform the selection of the two extreme groups. From the six groups who volunteered, the two most extreme groups of the six groups were selected based on their semester-long motivation profile in Collabucate. The motivation profile was based on combined ratings of motivation from individual group members. Each week, every individual in each group rated the group's current level of motivation to work together. The individuals were asked, "on a scale of 0-100, how would you rate your group's current level of motivation to work together?" The four to five individual responses were averaged to give a collective group motivation measure. In Figure 4, the collective group motivation measure was graphed over the semester.

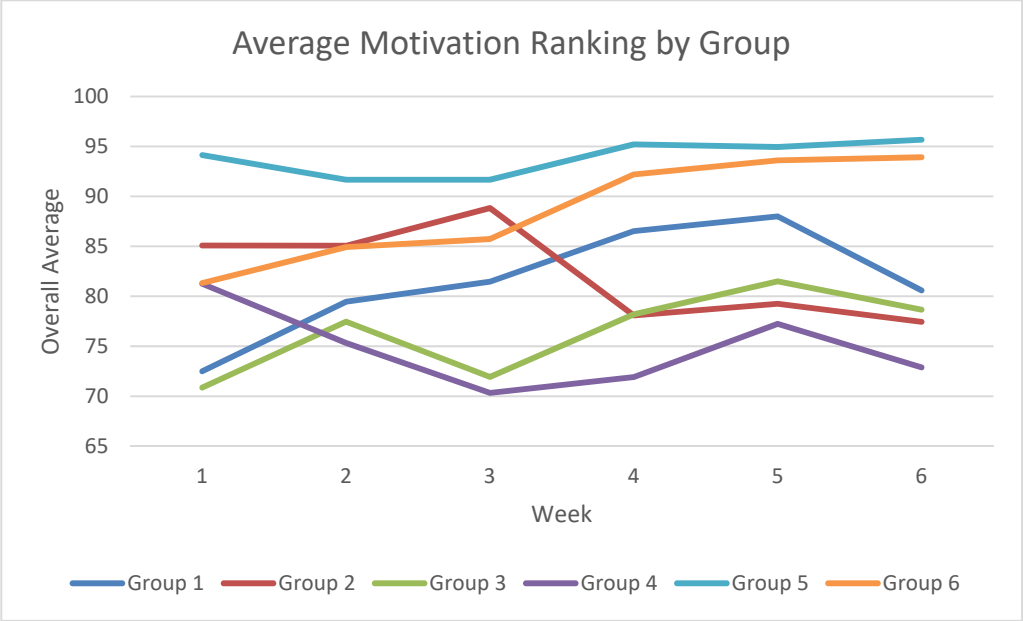

Figure 4. The average motivation ratings by group.

By graphing the six groups' motivation measure, five different motivation profiles emerged. The group motivation scores ranged from 96 to 69. Group 5 reported high levels of motivation throughout the study. Group 4 reported motivation levels in the middle of range during the first week and then fell in motivation throughout the study with a small incline at the end of the study. Group 6 also reported middle of the range motivation to start and then steadily rose throughout the study. Group 2 reported middle of the range motivation and then made a steep decline in the motivation in the middle of the study. Groups 1 and 3 started with low motivation, experienced some variable, but eventually landed with a higher motivation score. This decline was then steadily maintained through the remainder of the study.

I determined the two most extreme cases to be group 4 (low self-rated group) and group 5 (high self-rated group). I selected the high self-rated group to explore how they achieved high ratings throughout the semester. The low self-rated group was chosen because of the occurrence of motivation peaks and valleys throughout the semester, and because the low self-rated group

completed the semester with the lowest self-rated motivation scores.

For each group, I analyzed ten video sessions and six weeks of Collabucate submissions. The two selected groups' video corpus was about thirteen hours each. As stated previously, the intent of capturing all of the groups' events was to maintain the case-orientated approach and capture the holistic and context rich motivation journey of each group. The Collabucate submission data was coupled with the video data to aid inferences of motivation regulation processes and provide insight into learner thoughts and intentions. In the results section, I included the Collabucate self-reports from individual group members on what they rated their biggest group motivation challenges week to week. However, students had to choose from a preformed selection of motivation challenges that include the following: 1) our interest in the topic; 2) believing we will do well; 3) lack of goal setting and tracking; 4) lack of focus or commitment; and 5) differences in goals, priorities, and expectations. This list was developed from our understanding of the most relevant motivation challenges that student group experience (Laru et al., 2015). Also, I included in the results section, the log data containing information about how each student intended to overcome the groups' identified challenges.

Data Analysis

Intermediate representations. Video data are rich in both verbal and non-verbal information. B. Barron, Pea, and Engle (2013) suggested specific strategies for focusing the analysis of video data. Using Erickson (2006) whole-to-part inductive procedure, I first considered the video corpus as a whole by creating *intermediate representations* before a more in-depth analysis (B. Barron et al., 2013). I created the following *intermediate representations*: transcriptions, indexing, and narrative summaries (B. Barron et al., 2013).

For the *intermediate representations*, first all ten video sessions were transcribed

verbatim by Rev.com, a third-party transcription company, which included overlapping speech, laughter, actions, and pauses (Du Bois, Schuetze-Coburn, Cumming, & Paolino, 1993). The majority of students' gazes and other non-verbal's were not transcribed as they were not necessary to determine the types of context appraisals, motivation regulation, and motivation beliefs and cognitions. However, gazes were relevant to determining behavioral engagement and head nods were relevant to "quick building," a motivation co-construction mechanism. To account for the context of gazes, head nods, and other non-verbal's, researchers viewed the video clips during key parts of analysis and included them (e.g., head nods) to the transcription record when necessary. The transcripts were uploaded to MaxQDA® software for further analysis.

After transcriptions were completed, I viewed the video sessions and indexed significant events by noting them on transcription record. The end product was a time-indexed content log of the video files. Significant events included the start and stop times of when the groups were working collaboratively, working independently, speaking with their facilitator, off-task work, and on-task work. Significant events also included events that potentially constrained or afforded group motivation, but were not actual motivation constructs. For example, when students received summative feedback on a previous work product, I noted this as a significant event.

While indexing the videos with significant events and coding the data, I created four to five pages of narrative summaries (Derry et al., 2010) for each video session. The narrative summaries included elaborated descriptions of significant events and interactions. The purpose of these descriptions was to provide richer context and a time sequence of events for the later data analysis and synthesis stages. These descriptions are utilized in the results section to provide the reader with context for the data analysis.

Directed content analysis. Following transcription, indexing, and narrative summaries, two coders completed iterative coding, based on procedures for directed content analysis (Hsieh & Shannon, 2005). Hsieh and Shannon (2005) described directed content analysis as a method for interpreting the meaning of text data through coding and identifying themes or patterns. In this study, data were subjectively interpreted through a systematic process of coding and identifying patterns. The goal of directed content analysis was to validate or extend concepts into theories (Hsieh & Shannon, 2005). In this case, several motivation theories were validated and extended to group-level phenomenon.

Coding procedures. Overall, coding is an iterative and cyclical process (Saldaña, 2016). Coding constructs typically start out fuzzy, so the purpose of the iteration was to create more concrete codes in the codebook. First, I reviewed the study methods, constructs, and codebook with the second coder. Then we engaged in a coding calibration phase (Miles et al., 2013). During the coding calibration phase, we coded one full video session together and updated the codebook as disagreements and difficulties emerged and were then resolved. Then the two coders coded the data independently. During the coding process, coders were encouraged to make jottings or "analytic sticky notes" in the MaxQDA® transcription record. A jotting is an emergent reflection that can occur during the coding process. Miles et al. (2013) advocated for the use of jottings as they maintain coders' alertness, aid in making deeper inferences, and can be useful in the final write-up. In addition, Miles et al. (2013) claimed that analytic memoing is "one of the most useful and powerful sense-making tools at hand" (p. 95).

Throughout the coding and synthesis process, I wrote analytic memos to expand on both coders' jottings or new theoretical, analytical, or methodological ideas. Also, I purposefully wrote a memo for each video session. In the memo, I asked myself the following two questions:

"overall, what seemed like significant events or interactions?" and "overall, what events or interactions affected the students' motivation?" I answered these questions by thinking about the video session as a whole and deciding which events or interactions seemed most pivotal and created a change in the students' behavior. By the end of the data analysis process, I had a list of about four to six pivotal events or interactions per video session. In meetings with the second coder, I would also ask the second coder what they believed to be the overall significant events and interactions for each video session and had the second coder verify my lists for half of the sessions. During my data synthesis, I used the lists to verify with myself that my codes and models were representative of the most important interactions. Also, I continually returned to these lists while preparing the manuscript for the results section. I used the lists as guide for selecting which events and interactions to include in the manuscript.

After coding each video session, the two coders met to calculate inter-rater reliability and negotiate the codes until a consensus was reached. Inter-rater reliability was measured by Cohen's kappa (Cohen, 1960) which includes an adjustment for chance to total observed agreement. The benchmark for intercoder agreement depends on the what is being measured, but level of agreement above 0.8 is considered strong agreement or high reliability by some (Landis & Koch, 1977; Saldaña, 2016). In a previous study of SSRL, the researchers reached a kappa value of 0.62 for episodes of SSRL that the authors deemed acceptable for the complex measure (Isohätälä et al., 2017). The definitions of codes became sharper as the two coders coded the same data set and discussed their initial difficulties. Disagreements between the coders cued me to expand or amend definitions and reorganize constructs. I was assigned codebook editor as recommended by Guest and MacQueen (2008, p. 132). Being codebook editor included updating the codebook as both coders came to agreements about the content of each coding theme.

After the two coders independently coded 20% (four video sessions), the coder percent agreement was 90% across all codes, which was a Cohen's kappa of 0.8. Therefore, I independently coded the remaining data according to the protocol that if at least 20% (i.e., four video sessions) had been independently coded by two coders and an inter-rater agreement of 0.8 or over was reached, then only one coder would independently code the remaining data. During the independent coding of the remaining data, the second coder audited at least 30% of my independent codes. During auditing, the second coder evaluated my codes, noted any disagreements, and we discussed any disagreements.

As codes become solidified and refined, it is important not just to code, but to recode (Saldaña, 2016). After the entire data set was coded once, I used the resulting codebook to revisit the codes and updated them with any changes that had been made to the codebook. I also further categorized codes into sub-types under each coding category if I believed there were important qualitative differences within a coding category. For example, under the coding category "task value" there were qualitative differences between a student saying "I don't care" and another student saying "this is very useful." Therefore, I further sub-coded these as a "I don't care" category and "utility value."

At the conclusion of the study, the codebook contained a definition and typical exemplars for each code. For certain codes, it also contained inclusion criteria, exclusion criteria, atypical exemplars, and a "close, but no" category (Bernard, Wutich, & Ryan, 2016, p. 149). The unit-of-analysis for motivation mechanisms and targets included turn by turn student statements. Coding for the motivation targets (e.g., competence perception) overlapped with codes for motivation co-construction (e.g., externalizing). If a student asked another student, "how do you think we will do," this was coded as both a competence perception at the group-level and the mechanism

would be externalizing.

***A priori* code development.** The majority of codes were predetermined theory-driven codes, but I also included data-driven codes as recommended by DeCuir-Gunby, Marshall, and McCulloch (2011) as a strategy for coding and codebook development. The coding process started with an initial codebook with *a priori* codes. The *a priori* codes were developed by first reviewing the literature on motivational beliefs and cognitions, engagement, context appraisals, and motivation regulation. Then I narrowed the list by selecting constructs that were observable in a group setting, had theoretical or empirical evidence for being a significant difference maker in collaborative learning, and did not significantly overlap with other constructs. Codes were either developed from previous codes reported in the literature or, for the majority of codes, through an understanding of the theoretical constructs. The advantage to adapting other researchers' codes is an ability to align, compare, and contrast with another researcher's findings; however, the disadvantage is that their assumptions, projections, and biases are also accepted (Saldaña, 2016).

For the selected motivation belief and cognition constructs (e.g., achievement goal orientations, competence perceptions, identity, causal attributions) and student appraisal constructs (e.g., task difficulty, subjective task value), previous researchers have only measured these constructs using individual-level using self-reports. When students fill out a self-report (e.g., Collabucate), their answers may be influenced by social desirability bias. In the case of motivation, students may believe it is more desirable to report higher levels of motivation and adaptive motivational beliefs (Duckworth & Yeager, 2015). Also, it is difficult for researchers to compare across students' answers due to students' alternative frame of reference (i.e., reference bias) (Duckworth & Yeager, 2015). For example, in Collabucate, students were asked to rate

their motivation on a scale of 1 to 100. Two students may both enter "90," but have drastically different motivational beliefs, states, and behaviors. Lastly, self-reports are less capable of capturing moment-by-moment changes and student interactions.

Therefore, I coupled a self-report (i.e., Collabucate) with observational measures of motivation constructs. To answer my research questions, I observed motivation constructs on the social plane by measuring the *manifestations* of motivation beliefs and appraisals as *statements*. For example, statements related to achievement goal orientations naturally arise in student discourse. A student may tell the group, "Let's not get a bad grade on this next assignment." In this example, a coder could infer that the student is expressing a performance avoidance orientation.

Observing for motivation constructs was not without its challenges. Many of the constructs were easily identifiable, but, in particular, measuring motivation regulation processes and achievement goal orientations required higher levels of inference. Therefore, I adapted my approach to measuring these constructs during data analysis. Also, I wrote analytical memos throughout the coding process to document barriers and insights to measuring motivation constructs through observation.

Coding for motivation regulation. The only previously reported codes used for this study were for motivation regulation constructs. Regulation processes, broadly, have been coded at the unit of analysis of episodes for either CoRL or SSRL (Hadwin et al., 2018). However, I differed in my approach compared to previous researchers by deconstructing CoRL and SSRL into small units of analysis in order to improve inter-rater reliability and provide an opportunity to compare smaller units of the process across the two groups. Specifically, I measured motivation regulation processes as regulatory statements, group take up, and the outcome of group take up as outlined

in Chapter 2.

In the previous literature, Järvelä and Järvenoja (2011) coded for six types of group-level motivation regulation strategies (e.g., interest enhancement). In this study, I aimed to extend their work by coding for sub-types of motivation regulation strategies and matching them with the type of challenge students were regulating. For example, the strategy "interest enhancement" does not provide any details for how students enhanced their interest. Therefore, the result is difficult to apply to those who want to instruct students on optimal collaboration practices. In fact, when we designed Collabucate, we found that the current literature offered limited direction on how to instruct students on motivation regulation strategies. In response, I coded for not only the category "interest enhancement," but also sub-codes including "aligned personal interests with the task" and "created an enjoyable learning environment." I also paired each regulation strategy with a motivation challenge. In the example with "interest enhancement," I coded whether the challenge was simply the task demands or the students were struggling with their low interest in the task.

For regulation strategies, it was difficult to determine whether a student was using a strategy or an automated process, yet, certain characteristics of the situation led to more defensible inferences. Since regulation is defined as an intentional, not automatic, process (Hadwin et al., 2018), it was important to distinguish between the two. In some situations, the coders knew the students were experiencing a challenge because they discussed the challenge previously or selected it on Collabucate. Therefore, when the students did something to regulate for the known challenge, we were more likely to code this as a regulation strategy. Also, we coded episodes of motivation co-regulation with greater confidence when students used argumentation processes. For example, one student tried to convince another student to write an

email to their contact by saying, “the ultimate goal is to have something of value and if it’s collaboration with your [contact], I think that is perfectly reasonable.” In this example, the student is trying to persuade the other student of the utility and value of the action by using the pronoun “your” and building an argument. The student is not discussing their own motivational beliefs as an automatic expression, but, instead, purposefully attempting to change the group member’s motivational beliefs.

Coding for achievement goal orientations. I began coding with definitions for avoidance or approach types and task-based or self-based types of performance and mastery orientations. Of the entire set of motivation theories, achievement goal orientation theory was the most difficult to apply to the data set. However, I achieved higher inter-rater reliability after breaking the constructs down into types of motives and realizing that, by capturing students’ statements to each other, I could be clear of the students’ motive, but not always their orientation. For example, students would often say, “let’s be super efficient today.” This proclamation suggested that the student wanted to get the assignment done in a timely manner. However, it was unclear whether the underlying orientation (i.e., reasons) were *performance approach*, to beat a normative standard or appear smart, or *mastery approach task-based*, to complete the absolute demands of a mastery task, or both. In this manner, the motive to be efficient was a result of a deeper yet unknown orientation. Therefore, I first coded for students’ motives. Then I sifted through the motive types and categorized them into orientations when there were no possibilities for an alternative orientation. For example, a students’ motive “to learn” can only derive from a mastery orientation. Conversely, a student’s motive “to be efficient” could either be derived from a mastery or performance approach depending on their underlying reasons for why they want to be efficient. In the final report, I noted when a certain type of motive could be the result of

multiple orientations. I also deleted the task-based or self-based types of mastery orientation since they could not be identified using students' statements.

Inductive code development. Inductive open coding is appropriate when prior knowledge of a phenomenon is limited (Elo & Kyngäs, 2008). Open coding is an interpretive process of breaking down text data analytically to derive a new code (Saldaña, 2016). I used inductive open coding (Saldaña, 2016) for categorizing motivation challenges, creating sub-types under established codes, and deriving emerging motivation constructs. Any text coded as motivation that could not be categorized with the initial coding scheme was given a new code using open coding. Then all the open codes were analyzed later to determine if they represented a new category or a subcategory under an existing code.

Categorizing motivation challenges. Although previous researchers have measured regulatory processes through observation, no one has measured the types of regulatory *challenges* students experience through observation. For example, do students experience challenges to their motivation and engagement due to low group interest in the task, an individual with low competence perceptions, or threatening social comparisons? Similar to previous studies (Malmberg et al., 2015), I had access to student identified challenges from their interaction with Collabucate. However, these challenges were selected by students and relied on their own self- and social-awareness. Also, the students used Collabucate after group work so the accuracy of ratings depended on their ability to recall challenges. Furthermore, the students were only able to select challenges according to five preselected categories. In this study, the two coders inductively coded for types of motivation and engagement challenges. If a challenge type appeared to impair a students' attention (Butera & Darnon, 2017) or if the challenge was proceeded by a regulation strategy, then the coders were more likely to apply a challenge type

code. We applied a "challenge" code to these situations and every time we coded a regulation construct. Then after coding the entire data set, I evaluated the "challenge" codes as a set. Following inductive procedures, I sorted similar codes together and provided them with a representative label.

Collabucate log data were available to coders as reference material in order to aid their inference on whether a students' statement was regulatory or not. If the coders observed a motivation challenge type that was selected by a student on Collabucate, then the coders coded this as "motivation challenge on Collabucate." Also, coders noted with a specific code whether any of the observed motivation regulation strategies were previously provided by Collabucate.

Creating sub-types under established codes. After coding the entire data set, I used code mapping and categorizing to further differentiate the data whenever possible (Miles et al., 2013). As there was limited previous research, I was unaware of the extent to which the codes would emerge. By the end of the coding, I discovered that several coding categories could be further differentiated. For example, at the conclusion of coding the entire data set, I had 133 student statements and interactions coded for "task value." Then I read all 133 statements and categorized 105 into "high value", nine statements into "low value", and 18 statements into the *in vivo* category "I don't care." Since the "high value" sub-type still had 105 statements to differentiate from, I further categorized these statements into sub-types according to the literature in task value. The sub-types included attainment value, utility value, and intrinsic value. However, I had 53 remaining statements containing student expression of value in the form of "I like that" or "I love that." Therefore, I categorized these statements into an *in vivo* category called "like." Then, I explained in the results section that the "like" category was a type of task value but it was indiscernible from students' statements whether they "liked" something due to

its attainment, utility, or intrinsic value. The second coder audited the final sub-types. I followed the same process that I used for "task value" for several of codes.

For each emerging sub-type, I provided exemplars and descriptive explanations for how this sub-type occurred in the data (Hsieh & Shannon, 2005). For newly identified types and sub-types, I paid special attention to them in the final report to further refine, extend, and enrich theory (Hsieh & Shannon, 2005).

Deriving emerging motivation constructs. I also used open coding and code mapping for emerging and salient motivation constructs. For example, social goal orientations (Urdan & Maehr, 1995) (e.g., social approval) emerged as a salient reason for why students were engaging in the task and with each other. After coding two video sessions, I noticed their saliency in the data set. As a result, I searched the literature for types of social goal orientations (to be presented in the results section) and their definitions. Then I added them into the codebook. The coders categorized the data using the new definitions and revising as needed.

Post-coding analysis. Following coding and recoding, I reevaluated the relationship between the coding constructs. Based on the data, I revised the initial concept map that organized the relationship between the codes. Then I returned to my research questions. However, I noticed that the initial research questions contained assumptions about regulation that were invalidated by the new concept map. Also, when I began to write up the research results, I realized the order of the research questions would be difficult for the reader to follow. Therefore, I revised the organizing framework and research questions based on my new understanding of the constructs and for clarity and flow. I describe these exact changes in the results section and Appendix. Although I revised the research questions and organizing framework, I did not change the intent of the original study. In the results section, I characterize motivation co-construction

mechanisms, types of motivation constructs, and motivation regulation. I also explore differences between the two groups according to types of motivation constructs and motivation regulation.

To characterize constructs, I describe characteristics of codes and sub-codes. I also produced three emerging themes that were driven by the coding results and analytic memos. According to Miles et al. (2013), themes are topics that categorize a set of patterns. Researchers construct themes either from analytic work with codes or them may emerge independently by holistically reviewing the data corpus for patterns (Miles et al., 2013).

To explore differences between the two groups, I qualitatively compared the two groups across all codes and sub-codes (Bazeley, 2013; Yin, 2003, p. 107). Cross-case comparative matrices were used to examine how the two groups differed in each motivational construct (Yin, 2003). Each code category was exported into a Microsoft Excel spreadsheet according to the time point, group, and, at times, the individual student.

During the coding analysis, I realized the benefit of comparing the groups' codes according to the co-construction outcome (e.g., shared agreement, established agreement). As a result, I created matrices for each code to compare the two groups according to co-construction outcomes. Also, during the case comparison method, I returned to narrative summaries and transcripts of each group meeting to contextualize emerging findings. Eventually, group by group differences were generalized into themes (Bazeley, 2013) and are presented under each motivation construct.

The co-construction mechanisms allowed me to more sophistically think about the types of motivation that occurred at the individual or group level. At the individual level, I discovered it was important to note which student was the activator of different types of beliefs. For example, I discovered certain students would activate beliefs related to a mastery orientation.

The other students would, at times, take up their comments by elaborating or agreeing with him. However, it was revealing that the other group members would not *activate* mastery orientated beliefs. Also, I paid special attention to how group dynamics changed when individual students were absent or present.

At the group level, for each motivation construct, I analyzed the saliency and the extent to which the group co-constructed towards either a shared, established, or lack of agreement. For certain constructs, the group would come to shared agreement about a motivation construct in one direction and then the opposite direction the next meeting. In these instances, I was guided by the following questions: 1) was this due to a group-level change in the motivation construct?; 2) does the group hold both perspectives at the same time?; or 3) does the group have a stable difference of opinion with some individuals carrying one belief and others, a different belief? The clearest example of this discrepancy was the high self-rated group's achievement goal orientation. At the first few observations, I was deliberating whether the entire group was mastery orientated. Then I noticed two students activated some performance approach statements, two student activated mastery statements, and the last student did not activate any statements. Henceforward, I asked myself whether the group held multiple goals – performance approach and mastery. In the end, I concluded that some individual students were mainly concerned with mastery and other individual students with performance approach as they stuck to patterns of activating these beliefs accordingly. Therefore, I determined that the group never reached a group-level achievement goal orientation. What this example illuminated was that co-construction outcome codes were useful to understanding the group's current situated beliefs, yet they could also be understood as a collective set throughout time and different contexts to determine the group's ecosystem.

Ultimately, I aimed to derive an overarching "prime narrative" (Bazeley, 2013, p. 284) for how each group was motivated and regulated their motivation. A prime narrative is an overall thematic description that holds together all of the sub-themes and gives them meaning (Bazeley, 2013, p. 284). The prime narrative and themes are reported with supportive descriptive evidence and exemplars.

Framing of the Results

When writing qualitative research reports, there is an easy temptation to count codes (Morse, 2007). This can occur explicitly in frequency tables or subtly whenever the researcher uses words such as "frequently," "usually," or "generally." Morse (2007) advocated that qualitative researchers do not count because they are interested in meaning and implications over prevalence. It is also unlikely that each code has an equal opportunity to arise in data collection or that the sample is representative. Numbers can also distract readers from the important substance of the report. At the same time, numbers hold a descriptive value. For example, telling the reader that there were *five* students in a group, cues the reader into an important context. I choose not to include code frequency tables as each code does not have equal opportunity to emerge and I do not want to distract the reader from the meaning of the report. However, I do present some findings in terms of "frequently" and "often" when I believe the amount of something was important to understanding the context or the prevalence was an extreme case.

CHAPTER 4: RESULTS

Re-Organization of Constructs and Mechanisms

In qualitative research, research questions are expressions of the researcher's tentative theories about a certain phenomenon (Maxwell, 2012, p. 76). As the qualitative researcher analyzes data, it is common for research questions to evolve to account for new understandings of the theories (Maxwell, 2012, p. 76). After observing, analyzing, and synthesizing the selected motivation constructs, the data shifted my understanding of the relationships between the concepts. Therefore, I reframed my research questions to account for new understandings of motivation theories:

R1: What types of co-construction mechanisms (i.e., types of activation, group-take up, and outcome) did the groups use to co-construct motivation targets (e.g., task beliefs)?

*R2: How did motivational **task beliefs, values, and goals** occur in two extreme cases of collaborative learning groups, specifically:*

- *A) What types of motivational task beliefs, values, and goals emerged?*
- *B) What types of challenges and stimulus events invited what types of regulation statements and strategies for the regulation of motivational task beliefs, values, and goals?*
- *C) What differences existed in motivational task beliefs, values, goals, and regulation between the two groups?*

*R3: How did motivational **social beliefs, values, and goals** occur in two extreme cases of collaborative learning groups, specifically:*

- *A) What types of motivational social beliefs, values, and goals emerged?*
- *B) What types of challenges and stimulus events invited what types of regulation statements and strategies for the regulation of motivational social beliefs, values, and goals?*
- *C) What differences existed in motivational social beliefs, values, goals, regulation between the two groups?*

*R4: How did **motivational states and behavioral expressions** occur in two extreme cases of collaborative learning groups, specifically:*

- *A) How did motivational states and behavioral expressions emerge?*

B) *What types of challenges and stimulus events invited what types of regulation statements and strategies for the regulation of motivational states and behavioral expressions?*
C) *What differences existed in regulation of motivational states and behavioral expressions between the two groups*

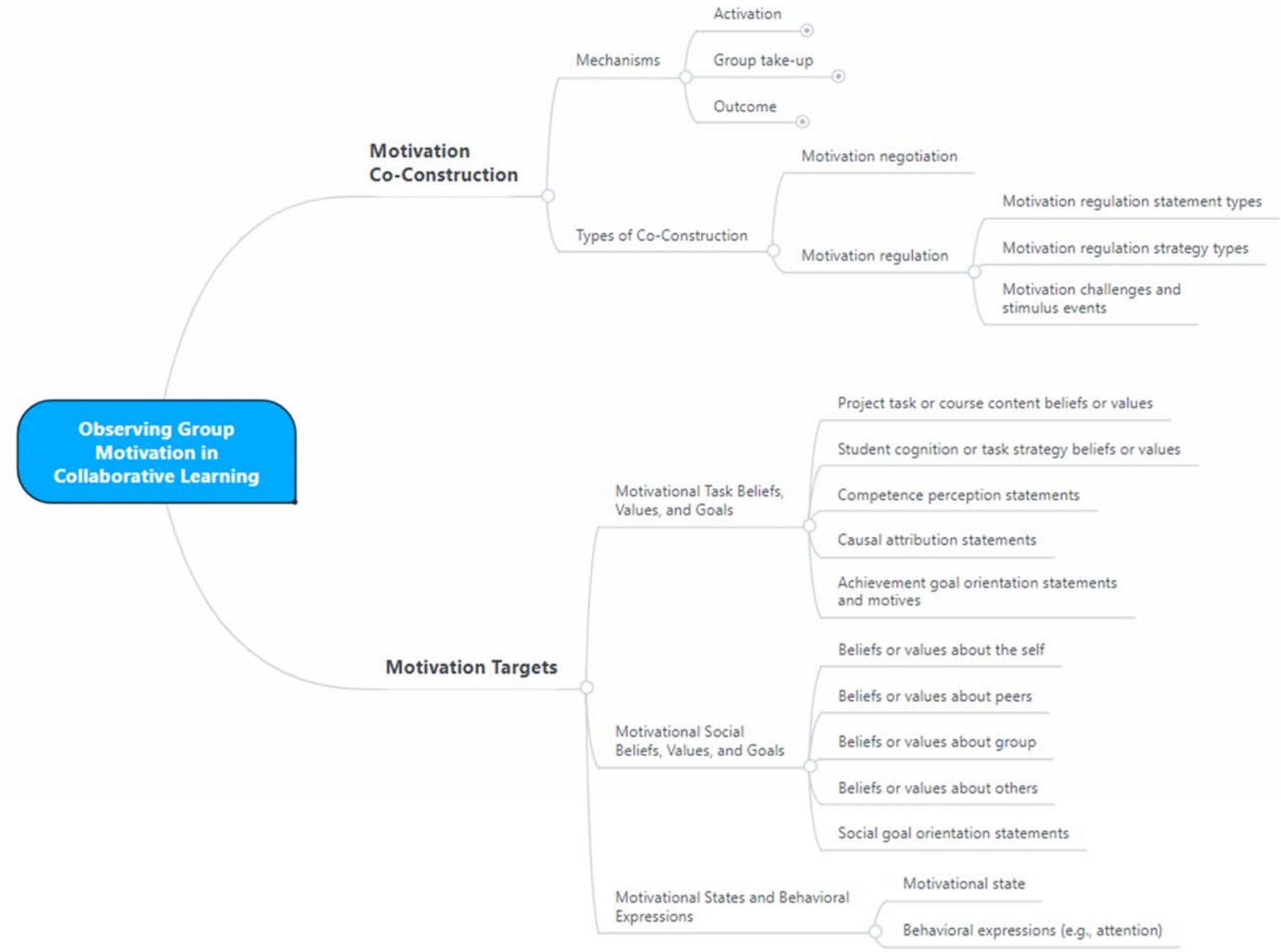

Figure 5. Resulting concept map of study constructs (organizing framework).

Brief summary of the organizing framework. In chapter two, Figure 1 depicted a concept map for the relationship between co-construction mechanisms, regulation, and the motivational targets based on the existing motivation literature. The concept map represented an organizing framework for the study. As depicted in Figure 5, I have since revised the concept map based on changes in the relationships between the constructs, the addition of constructs, the expansion of constructs, and changes made to the names of categories and concepts. In the Appendix , I provided an additional figure and table outlining all changes made to the overall conceptual framework. Throughout the results section, further supporting data and evidence for the changes are included.

The resulting concept map and organizational framework included motivation targets relevant to collaborative learning. The motivational targets can start as an individual students' belief, value, goal, state, or behavior and then become co-constructed within the group according to certain mechanisms. The co-construction occurs first by a student activating the co-construction, then the group may take up the activation, and, finally, the episode results in different types of co-construction outcomes (e.g., a shared agreement).

The resulting concept map and organizational framework included three overall domains for the motivation targets: 1) motivational task beliefs, values, and goals, 2) motivational social beliefs, values, and goals, and 3) motivational states and behavioral expressions. Motivational *task* beliefs, values, and goals are defined as any belief or value about the task, course content, a student's idea for the task (e.g., "that's a great idea Bill, we can use that for our final paper"), a student's ability for the task (e.g., competence perceptions), or attribution for task success or failure (i.e., causal attributions). Motivational task beliefs, values, and goals also included achievement goal orientations, which are students' reasons for engaging in the task. These

selected motivational beliefs, values, and goals are *task-based* as they may directly affect students' level and quality of engagement in the academic task process.

Motivational *social* beliefs, values, and goals included beliefs and values about a person or group. Compared to task beliefs and values, the social beliefs and values are more person-focused than task-focused and affected students' relationships with each other rather than their relationship with the task. Also, I included social orientation goals due to their saliency and easy identification in the data set. In comparison to academic reasons for students wanting to achieve (i.e., academic goal orientations), social goals are the social reasons for why students want to succeed (Urdan & Maehr, 1995) or socialize in academic situations (Allen, 1986).

The last target domain, motivational states and behavioral expressions, served as an expansion for the originally labeled "group behavioral engagement" construct. I decided to expand this section after coding for motivation regulation. The predominant form of motivation regulation in this study was students' regulation of their motivational state and behavioral expressions (e.g., attention, effort). I defined motivational states as the temporary motivation levels that a student feels, typically when they label themselves as motivated or not motivated. The category motivational states did not include more stable motivational beliefs, but in-the-moment energy and willingness. Behavioral expressions included the difference between when a group was on-task versus off. Behavioral expressions also included effort expenditure including effort allocation between members and time spent on activities. Motivational states and behavioral expressions were necessary to include as they were a predominant target for motivation regulation. Also, when students rated their own and the group's "will" each week in Collabucate, students most likely answered the question according to their evaluation of their motivational state and behavioral expressions.

Characterizing Motivation Co-Construction Mechanisms

In the following section, I address **RQ1**: *What types of co-construction mechanisms (i.e., types of activation, group-take up, and outcomes) did the groups use to co-construct motivation targets (e.g., task beliefs)?* I started coding with a co-construction framework adapted from Weinberger and Fischer (2006) and Hadwin et al. (2018). Throughout data analysis, I extended their work to account for nuances and complexities in students' co-construction of motivational constructs. The final categories of co-construction mechanisms are listed in Table 8. I illustrate the extensions to framework using examples from the data set.

Table 8

Resulting Categories of Motivation Co-construction (Revised from Table 2)

Mechanisms	Level of the Construct	Description	Examples
		Activation	
Externalization of motivation target pertaining to:		Externalizes a motivation target pertaining to the self, peer, or group through behavior or statements Can include follow up statements by the same student who elaborates on their previous statement before another student elaborates on it.	
Self	Individual level	Externalizes a motivation target pertaining to the self	"This assignment is too hard" "I will do well on this assignment"
Peer	Individual level	Externalizes a motivation target pertaining to a peer	"You will do well on this assignment"
Group	Individual level	Externalizes a motivation target pertaining to the group	"We will do well on this assignment"
Eliciting motivation target	Individual level	Questioning the motivation target of a group member or provoking a motivational reaction from a group member	"Do you think this assignment is too hard?"

Mechanisms	Level of the Construct	Description	Examples
		Group Take-Up	
Quick building	Group level	Statement is met with simple agreement by members of the group (at times to simply move on). Individual group members portray that they hold similar goals, plans, and evaluations. Can include head nodding and certain types of laughter.	"uh huh," "yea," "I agree"
Elaboration building	Group level	Another group member either builds on, relates to, or refers to reasoning of the activation statement. Does not reject previous statement	"Yes, and…" "We could also try.."
Conflict-orientated building	Group level	Disagreeing with, modifying, or replacing the motivational orientated statement of another group member. Can include certain types of laughter.	"No, I don't think…" "Actually, I think it is…"
Ignoring	Individual level	No communicated agreement from other group members. Either other members do not respond directly to the statement (simply not taken up) or do not respond at all.	Not applicable
Prompting or eliciting	Group level	Another group member asks a clarification question or prompts a statement	"Why do think the task will be easy?"
Changes direction	Group level	A student says something that changes or adds an additional target of the statement. Without previous statements, this would be considered another activation statement. However - because it follows a previous activation - it is group take up	Student 1: "I think you will do well" Student 2: "I think we will do well"

Mechanisms	Level of the Construct	Description	Examples
Outcome			
Inclusion criteria: Refers to all members of the group who were actively engaged in the conversation			
Shared agreement	Group level	Members of the group reach a negotiated agreement that was more than one individual's contribution. The take-up has to be elaborated upon by at least one other member of the group who did not say the activation statement. *Exclusion criteria:* One member of the group is in disagreement	*See elaborated example on p.113*
Established agreement	Group level	Passive agreement due to individuals either acquesciencing or spontaneously holding the same idea. Only includes quick building take-up.	*See elaborated example on p.115*
Lack of group agreement	Individual level	Agreement was not met due to conflict-orientated building or ignoring.	*See elaborated example on p.114*
Individual integration	Individual level	Taking over, integrating, and applying the motivation of another group member into one's own motivation	A student switches from wanting to learn the material to only caring about completing the task after other group members voice their motives

The following is an excerpt to demonstrate how motivation targets are co-constructed to reach a final shared agreement among the group members. In this example, the motivation target was the motivational belief "task difficulty." The applied co-construction codes are included in boldface brackets on the right-hand side. All names are pseudonyms.

Don:	*This is- this is a very manageable- this is way more manageable than I thought it was going to be.*	**[Externalization – Self]**
Facilitator:	*Yeah, I thought, uh ...*	**[Quick building]**
Don:	*I know, I thought- I thought it was gonna take, like, eight hours a week…*	**[Externalization – Self]**
Liz:	*….fiddling with pencils..*	**[Elaboration Building]**
Facilitator:	*Yeah*	**[Quick building]**
Liz:	*…lot of discussion…*	**[Elaboration Building]**
Don:	*..I know*	**[Quick building]**
Facilitator:	*Yeah*	**[Quick building]**

[Outcome: Shared agreement for task difficulty]

Don began the interaction by externalizing the belief that the task was manageable and easier than he expected. The facilitator and Liz built on his belief through quick building and further elaboration, resulting in a shared agreement among the group members and the facilitator that the task was manageable and require less time, discussion, and obstacles than previously believed. The outcome of the co-construction was "shared agreement" and not "established agreement" since the final negotiated agreement was created through more than one individual's contribution.

The following excerpt is an example of a co-construction interaction that ended in a "lack of group agreement" and showcases why I added two additional codes to the co-construction mechanism codebook.

Liz:	*You guys, what if we actually like ...*	**[Externalization – Group]**
Don:	*Solve world problems?*	**[Prompting or eliciting]**
Liz:	*Yeah and like, this actually solves this huge*	**[Externalization**

	thing and the institute gives us money	**– Group]**
Don:	*(laughter)*	**[Conflict-orientated building]**
Jason:	*I like your optimism.*	**[Changes direction]**
Liz:	*Because the end goal is money (sarcastic tone)*	**[Individual integration (possibly)]**
Don:	*Given the different elements ...*	**[Conflict-orientated building]**
Liz:	*I plan on making this, um ...*	**[Externalization – Self]**
Don:	*Into a million dollar endeavor?*	**[Prompting or eliciting]**
Liz:	*No, not a million dollar endeavor. I do want to go into policy so ...*	**[Externalization – Self]**

[Outcome: Lack of group agreement for task value, specifically future utility]

In this interaction, Liz expressed how she believed their group task had high future utility beliefs and prompted her group to join in her belief. Don further prompted Liz's externalizing statement by finishing her statement with the question, "solve world problems?" Don had neither built nor rejected Liz's statement at this point. He prompted Liz to elaborate on her original statement. As the original codebook could not account for this phenomenon, I added the code "prompting or eliciting." to address instances in which a student was not building but eliciting more information from the original student who externalized the comment.

In addition to the new code "prompting or eliciting," this excerpt also showcased an additional need for the code "changes direction." Next, Liz elaborated on her statement, seeking validation from her group. However, Don laughed at her comment conflicting with her sincerity. Jason did not outwardly reject her comment, but subtly rejected her comment by changing the direction of idea from "what if *we*" to "I like *your*." Liz was attempting to include the entire group in her idea, but instead of Jason saying, "yes, we should," he changed the direction of the idea to only include Liz. As this type of phenomenon was salient in the data set, I added the code "changes direction" to the codebook. Students would change the original direction of a statement to indirectly amend the statement, as was the case in the example, or, in other

instances, to build upon the comment. Another example of "changing direction" may include when a student externalizes "I think this task is hard," and another student may take-up up this statement and change the direction by saying, "I think we all do." In this other example, the direction of the belief is being changed from an "I" to a "we."

Later in the excerpt, Liz has integrated the change in direction from Jason. Instead of saying, "*we* should make this into a million dollar endeavor," she continued with the new "I" direction and said, "*I* plan on…" By the end of the interaction, there is a lack of agreement in the future utility of the task between the group members. Liz expressed a belief that the task had a very high future utility, whereas her group members never expressed their agreement for the task's high future utility. Therefore, the outcome of the co-construction was "lack of group agreement."

The following excerpt represents a co-construction episode in which the outcome was "established agreement." In this situation, Rick was attempting to convince Mary of the value of reaching out to one of her contacts for their group project. However, Mary was initially hesitant. Also, this interaction and others were the reasons why I specified "externalization" codes to include follow-up statements by the same student.

Rick:	*And just like with these exercises, these conversations we're having right now, it's a kind of a unique thing, you know, you don't really get an opportunity to do that.*	**[Externalization – you]**
Mary:	*Mm-hmm (affirmative)*	**[Quick building]**
Brett:	*Mm-hmm (affirmative).*	**[Quick building]**
Rick:	*And I think you walk away from it, like, having learned a lot but ...*	**[Externalization - you]**
Mary:	Yeah.	**[Quick building]**
Rick:	*... um, the ultimate goal's to have something of value and if, if it's a collaboration with your [redacted], uh, mentor, [redacted name]...*	**[Externalization – you]**
Mary:	*Mm-hmm (affirmative)*	**[Quick building]**
Rick:	*... your, whatever institution, I think that's perfectly reasonable*	**[Externalization – you]**

[Outcome: Established agreement for task value – specifically, unique opportunity, utility for Mary to connect with her mentor]

In this example, Rick activated the co-construction interaction by externalizing his belief that contacting Mary's mentor would be valuable similar to how the task is valuable. The other students took up his statements with head nods and "yeah" (i.e., quick building). Then he continued to expand on his initial externalization statement. I decided to define the externalization code as also including any of the initial students' own follow up elaborations. Alternatively, these follow up externalization statements from Rick could have been coded as "elaboration building." However, I wanted to maintain the integrity of the "group take-up" category to only include interactions of how the remaining group members take up the statement from the student who is externalizing the statement. Overall, this nuance is important to distinguish because if I had coded Rick's elaborations as "elaboration building" then the episode would have fit the definition for "shared agreement." However, as exemplified in the excerpt, the interaction more closely fits with the definition of established agreement; the other students are acquesciencing or spontaneously holding the same idea.

The last co-construction outcome, individual integration, was not easily identifiable but did occur in this data set. The clearest example was Viola's response to another students' idea, "30 seconds ago I would've said that was dumb, but my thought process has shifted." Due to a cognitive shift, she claimed to hold greater value for another students' idea.

In another example, Jason and Viola were sharing how they recently witnessed the effects of their project content at their internship. During this example, I classified Jason and Viola as expressing utility value for the project content. Before the interaction, Don had voiced a low value for the project content, but then he asked Jason and Viola further about their utility value

for the project content and responded positively. Don's tone changed after the interaction, albeit for a short while, and he seemed surprised. Since Don responded uncharacteristically, I coded the interaction as individual integration for Don., which aided the inference of coding Don's response as individual integration.

Don:	*It's, I was just going to say cool that you guys get to see it in practice.*
Viola:	*Yeah?*
Don:	*Did you look at it, and you were like "Oh, this is like what we're doing..."*
Viola:	*Yeah*

Another inference aid for coding "individual integration" was when students reversed their previous statements. For example, in the first group meeting, Liz exclaimed how difficult the task was going to be by saying, "oh, god. I think I'm going to be sick." However, she changed her tone and said, "y,all, we can do this" after interactions with her group members. Therefore, although individual integration was not easily identified, the following interaction characteristics provided evidence for individual integration: reversing previous statements, changes in tone, and the expression of cognitive shifts (e.g., oh!, "huh").

Overall, I found that students co-constructed motivational beliefs, values, and goals with similar mechanisms as knowledge co-construction. One student activates co-constructing by either externalizing or eliciting for a motivational belief, value, or goal. Then the group may or may not take-up the statement. How the group takes-up the statement results in either a shared agreement, established agreement, or lack of group agreement for the motivational belief, value, or goal. I also described two new group take-up mechanisms called "changing direction" and "eliciting or prompting."

An emerging undercurrent of the motivation co-construction mechanisms was the influence of individual student status and power. In the low self-rated group, Jason appeared to

hold the most weight whenever he activated a motivation construct or built on another student's comment, whereas Liz repeatedly attempted to regulate her group or share motivational beliefs that were ignored or rejected. Although the focus of this study was the co-construction of motivational constructs, these dynamics persisted across cognitive and metacognitive aspects of the students' collaborative learning such as argumentation and task planning.

Two motivation co-construction pathways. In addition to specifying each co-construction mechanism, I distinguished between two types of co-construction pathways: a negotiation pathway and regulation pathway. Previously, I distinguished co-construction as mechanisms that could *target* motivational regulation among others (e.g., motivational beliefs). However, I discovered through data analysis that this was a false assumption. I have since reorganized concepts and conceived of motivation regulation as a *type* of co-construction pathway. It was crucial to differentiate between negotiation and regulation pathways in the co-construction model to adequately answer part B of research questions two, three, and four.

As depicted in Figure 6, students co-constructed three different target domains (e.g., motivational task beliefs, values, and goals) through the co-construction mechanisms under the categories of activation and group take-up, resulting in a co-construction outcome. The co-construction was either negotiating or regulating depending on the degree to which students were intentionally targeting their motivational beliefs, values, goals, states, or behavioral expressions. The regulation pathway was more intentional and included the use of strategies. The negotiation pathway was unintentional and included the use of skills. According to the definition presented by Alexander (2018), strategies and skills share certain characteristics, but when students use strategies, they are aware of trying to control the target whereas skills are automatic and internalized patterns.

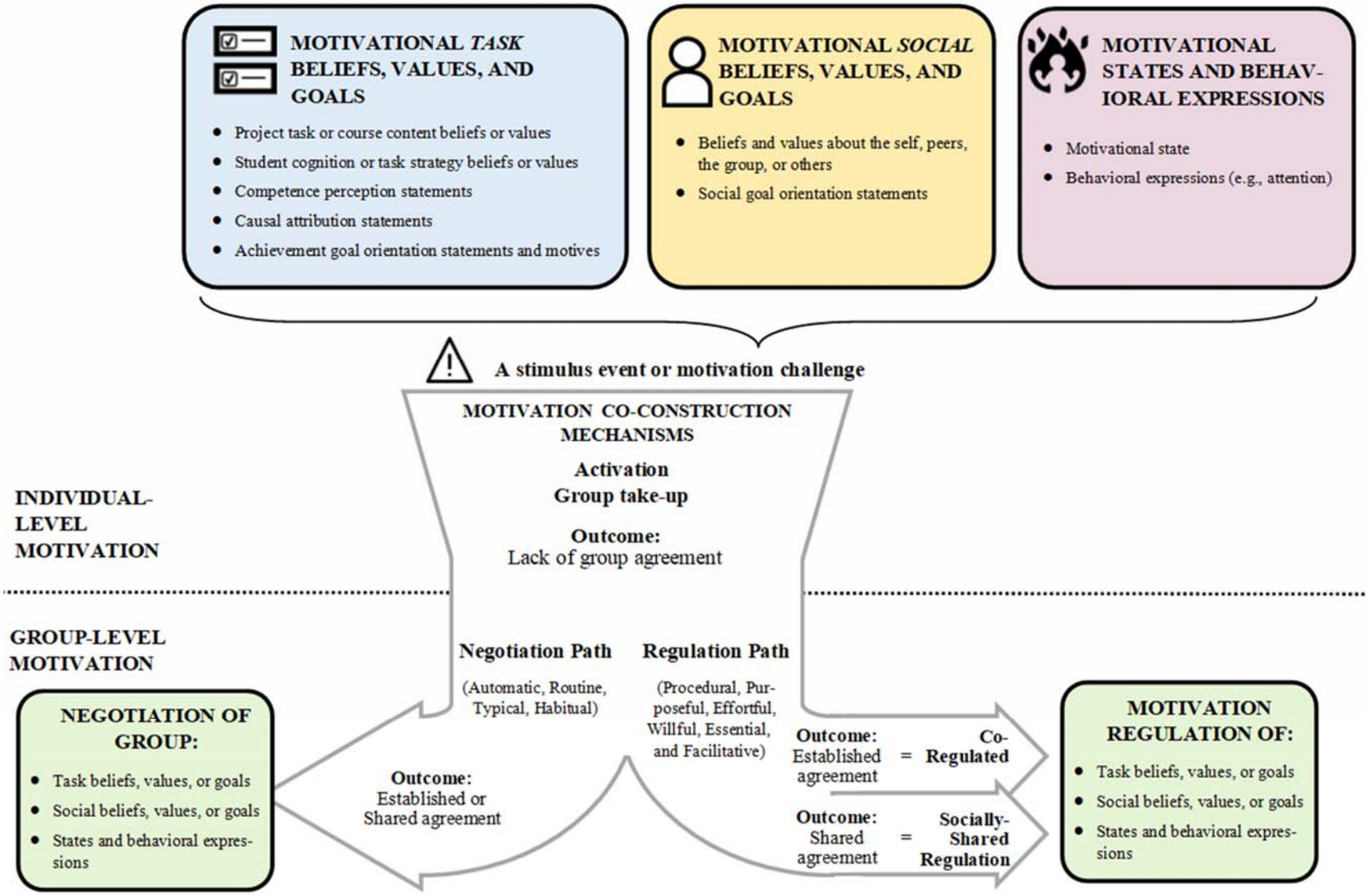

Figure 6. How the co-construction of motivation constructs leads to negotiation or regulation.

Motivational Task Beliefs, Values, and Goals

In this motivational task beliefs, values, and goal section, I address **RQ2**: *how did motivational **task** beliefs, values, and, goals occur in two extreme cases of collaborative learning groups?* In the first sub-section, I characterize the types and sub-types of motivational task beliefs, values, and goals emerged in both groups. In the second sub-section, I characterize the types of challenges and stimulus events that invited both groups to participate in certain types of regulation of motivational task beliefs, values, and goals. In the last sub-section, I compare between the two groups' negotiation and regulation of motivational task beliefs, values, goals.

Characterizing types of motivational task beliefs, values, and goals. In this subsection, I address **RQ2 part A**: *what types of motivational task beliefs, values, and goal emerged?* I coded for the presence of the following types of motivational task beliefs, values, and goals: 1) project task or course content beliefs or values, 2) student cognition or task strategy beliefs or values, 3) competence perception statements, 4) causal attribution statements, and 5) achievement goal orientation statements. Under each type of motivational task belief, value, and goal, I coded for subtypes that are described in results tables. For particularly complex or novel sub-types, I provide representative and exemplary quotes and interpretations.

Project task or course content beliefs or values. The students made nine specific types of motivational project task or course content belief and value statements under three categories. Two of the categories and the subcategories were applied from previous work by K. E. Barron and Hulleman (2015): task value and costs. A third category, task difficulty has been discussed in several studies (McCaslin & Hickey, 2001; Paris & Turner, 1994). How students expressed their beliefs and values for the project task and course content are presented in Table 9.

Table 9

Types of Project Task or Course Content Beliefs or Values

Types of Project Task or Course Content Beliefs or Values	Representative Student Quote(s)
	Value
Attainment	"We need that high pass" "Apparently there is a prize"
Utility	"I think the ultimate goal is to have something of value and if, that's collaboration with [professor].." "He wants to put this in his portfolio"
Low value	"It's also pass fail, so" "we don't need [this course]"
"Don't care"	"I don't care if I get an F"
	Costs
Loss of valued alternatives	"Other people got edits to the paper on their feedback. For us, we just got that, which is borderline useless." "I wish this class in some ways left more room for other things."
Effort and time costs	"Let's get this done, because I need to go study for [other course]"
Emotional costs	"I hate creating citations" "Everybody's just gonna be hating life the entire time [during final presentations]"
	Difficulty
Hard	"This is going to take forever"
Easy	"This is totally doable"

Overall, students expressed value for the task and course content on a continuum from high value to low value. Students shared with each other what they thought had value and lacked value. In the Wigfield et al. (2017) expectancy-value-cost model, the attainment and utility value types emerged from our data, but not intrinsic value. Intrinsic value is defined by the inherent enjoyment or interest students experience for engaging in the task. The students expressed these experiences for how they approached the task but never for the task itself. For example, one student approached the task by reading an article that they believed was "really interesting."

However, no students expressed intrinsic value in the task, writing the written proposal and delivering the oral presentation, nor the course content. I believe this was due to students' lack of interest in the task or students managing their impression with their peers.

In addition to expressing what they believed was high value and low value, the students expressed three different types of costs that have been previously reported in the literature (Wigfield et al., 2017). The three different subtypes included loss of valued alternatives, effort and times costs, and emotional costs. Although the intensity was not measured, students' perceived costs seemed to range in intensity. Before taking an action, a student would frequently complain or vent about the costs of taking the action. These types of comments happened regularly and were usually met with a head nod or ignored by other group members. However, when students expressed a task cost with a high intensity, this was usually met with greater discussion. For example, one student stated that he was upset with the course feedback the group received. He expected that the course feedback would provide direction with how to improve their performance. Therefore, I interpreted this interaction as the student expressing that the task cost him the loss of a valued alternative (i.e., providing specific feedback on how to improve).

Student cognition or task strategy beliefs or values. In the literature on individual student motivation, researchers have focused on the previously characterized task beliefs. However, it became immediately clear in our initial coding that students also judged their own and other students' ideas (i.e., "great idea") and task strategies based on value, costs, and difficulty. I distinguished the target "project task or course content" from "student cognition or task strategy" based on whether the action was instructed by the professor or chosen by the students.

For data coded with both "value" and "task strategy" or "student cognition," the data

were sorted into identical sub-categories. As depicted in Table 10, the students made thirteen specific types of motivational student cognition or task strategy belief and value statements under three categories. Compared to task beliefs, task strategy beliefs also included intrinsic value and an indiscernible category. The indiscernible category included whenever the students simply said they "like" or "love" another student's idea for a solution or task strategy. A common interaction for the students was when one student would say an idea, and another would respond with "I like that." This sub-category was called indiscernible because the statements were related to value, but it was unclear whether the students valued the object according to intrinsic, utility, or attainment value.

Table 10

Types of Student Cognition or Task Strategy Beliefs or Values

Types of Student Cognition or Task Strategy Beliefs or Values	Representative Student Quote(s)
	Value
Attainment	"I think the literature review is very very important"
Utility	"[The article] has numbers we can use"
Intrinsic	"Oh my gosh… that's really cool" "So read that scenario which is pretty interesting"
Indiscernible – Related to value	"I like this" "this is good" "this is valuable" "I love this"
Low Value	"It's a little bit old and simplistic"
"Don't care"	"I don't care about [making a group contact sheet]"
	Costs
Opportunity costs	"Yes, but it has to be PowerPoint, not Google slides, they don't do enough"
Effort and time costs	"Prezi has too much going on"
Emotional costs	"Yeah, it's boring"
Social costs	"I don't know how comfortable [professor] would feel"
Sunk costs	"All right. Now we have to rewrite the thing, yet again"
	Difficulty
Hard	"It's really hard to do that first"
Easy	"it would be easy for us"

Competence perception statements. Compared to the previous two sections that are students' beliefs *about* a task, the following three sections are students' beliefs *within* a task. I observed students state their perceptions about their individual, peer's, or the group's competence. These competence perceptions could be labeled as either "confident" or "not confident" but existed on a continuum. For example, one student implied he was confident in

attaining a good grade on his portion of the group assignment by saying "I won't fail mine." He also implied that another student was going to do well on a test by saying, "not that you need to study apparently." In the group, the students would tell each other "we're going to get that high pass" or "we're going to win." It cannot be said with certainty if the students said these types of group-level statements to regulate the other group member's competence perceptions or they were simply expressing their own beliefs. In situations in which students expressed "not confident" competence perceptions, they stated it as fact or would joke about it. For example, one student said, "we don't know any of our grades yet" followed by a different student who said, "Yeah. We might have failed the next two, who knows?" This statement was said in a way that implied joking, but also hinted that the student was not confident in the group's future performance.

Causal attribution statements. The six subtypes for causal attributions, created by R. P. Perry and Hamm (2017), were applied to our data. The subtypes included internal, external, controllable, uncontrollable, stable, and non-stable causal attributions. In this data set, there was only one opportunity to observe students' causal attributions for their grades and feedback. The high self-rated group never discussed causal attributions. Near the end of the project, the low-rated group received an average grade and, what they interpreted as, poor written feedback on their previous assignment. The group discussed why the feedback said that they did not follow the format and had insufficient detail. The following is an excerpt from the groups' conversation with applied codes:

Jason:	*Do they [grader] realize we had a page limit?*	**[External, unstable, uncontrollable cause]**
Viola:	*So, this was the one ... Okay... This was the one I submitted, and it was literally just a four lettered list.*	**[Internal, unstable, controllable cause]**
Jason:	*Ohhhh.*	**[Individual**

		integration]
Viola:	*So they said that "it should have an introductory paragraph, along with more specific details for each solution," which I kind of disagree with because that's what we do in the whole next submission, but ...*	**[External, unstable, uncontrollable cause]**
….		
Jason:	*I wonder who gave us feedback this time.*	**[External, unstable, uncontrollable cause]**
Liz:	*I don't know.*	

In this example, the low self-rated group does not quite come to an agreement on the cause of their poor feedback. Jason started by blaming the grader and task requirements. Viola attempted to clarify that the feedback was reasonable since they submitted a four bulleted list as their assignment (i.e., internal attribution). Viola's statement shifted Jason's understanding of the cause, but then she later elaborated that she disagrees with the feedback. Jason hinted that he still blamed the grader. By building off of each other, Viola and Jeff appeared to end the interaction with a shared external, unstable, and uncontrollable attribution.

Achievement goal orientation statements and motives. As outlined in the methods section, I was unable to definitively categorize students' statements into achievement goal orientations. Nonetheless, I was able to categorize students' statements into *motives*. Then certain types of motives were categorized into achievement goal orientations. As displayed in Table 11, I observed the students make ten specific types of motive statements under four orientation categories; performance approach, mastery approach, and two indiscernible goal orientation types. I did not observe any motives that could be definitively labeled as performance avoidance or mastery avoidance orientations. The motives "to get good grades," "to get a good job," and "to beat other teams" were categorized under a performance approach orientation. The only motive type that could be solely attributed to a mastery orientation was "to learn." Of the types of motives that had indiscernible achievement goal orientations, these were divided into

two categories; motives to avoid work and motives to approach work. For the work avoidance motives, these motives could have been the result of either a work avoidance achievement goal orientation (Dowson & McInerney, 2001) or a regulation strategy of students with a performance orientation. The four work approach motives included “to be efficient”, “to just get done”, “to improve performance”, and “to put forth good effort”. For these four work approach motives, I had varying degrees of confidence whether they fit a performance, mastery, or a new type of orientation.

Table 11

Types of Achievement Goal Orientation Statements and Motives

Motive Types	Representative Student Quote(s)
	Performance approach orientation
To get good grades	"[I want a] high pass"
To get a good job	"I was talking to, um, the pharmacist at [national conference] and he was like, 'Honestly, like, most residency programs, as long as you have above their cutoff, which is usually a 3.3, like, you're fine,' and honestly they get concerned if they see a 4.0 because that means you never failed"
To beat other small groups	"You just gave it [an idea] to our competition."
	Mastery approach orientation
To learn	"I'm over here saying no no no let's back up, let's talk, let's spend two and half hours talking about things"
	Work avoidance motives - Either work avoidance or performance orientation
To avoid work	"If we don't want to do stuff, like, we could just do other work until [facilitator] comes in" "Oh, I'm going to make my figures huge. 'Cause that's going to take up more space. That's going to be more page count."
	Work approach motives - Either performance, mastery, or work approach orientation
To be efficient	"We should be super efficient" "I don't wanna just piss around"
To just get done	"Let's just get this done"
To improve performance	"We have intentions to be better, but we don't really know where our actual flaws with respect to performance lay"
To put forth good effort	"I would just like to put forth good effort"

I categorized "to get good grades," "to get a good job," and "to beat other small groups" as a performance approach goal orientation as these motives represented a desire to beat a normative standard. Currently, there are three alternative perspectives around the defining features of performance orientation (Senko et al., 2011). The research data supported Senko,

Elliot, Harackiewiscz, and Thrash's view that performance goal orientation only includes a striving to beat a normative standard and does not include the desire to demonstrate competence. Therefore, I categorized students' motives for beating a normative standard (e.g., get good grades) into performance orientation, whereas I categorized competence demonstration motives into the social approval goal orientation (to be reviewed in the next section). The individual students in the high-rated group cleanly fell into either one of the two categories, competence demonstration or beating a normative standard, and spontaneously discussed their indifference for the other. For example, one of Rick's (student in the high self-rated group) main drivers was to succeed on the group task was to build his reputation with the school faculty, which was a competence demonstration motive. However, he told the other students, "I don't care about grades," therefore he did not hold a desire to beat a normative standard. Therefore, I believed Rick held a strong social approval orientation (Urdan & Maehr, 1995), but not a strong performance approach orientation. Inversely, other students in his group wanted to get a good grade, get a good job, and beat the other teams (i.e., performance approach), yet they hid their accomplishments, shared their failures, and laughed and rolled their eyes about Rick's need to impress the professors (i.e., low social approval).

The high self-rated group discussed how the strength and direction of their performance approach orientation has changed throughout time.

Rick*:* *I'm not too worried. I think at this point, I'm not obsessed with getting, like, all A's anymore.*
Mary*:* *Same same. I know a lot of people still are.*
Brett*:* *The good want to.*
Rick*:* *You want to?*
Mary*:* *Like I do, but I'm not going to beat myself up like I did in undergrad, you know what I mean?*
Rick*:* *Or even last, I mean, last year I would have cared a lot more.*
Mary*:* *Yeah.*

In this example and others, Rick claimed that the direction of his performance approach orientation changed from having a performance approach to not espousing one. Mary claimed that either the strength or her attachment to her performance approach has lessened now that she was in pharmacy school. Lastly, Brett pointed to the idea that getting good grades in pharmacy school may have originated from a deeper motive of being a good student or a good person.

Work approach motives – Either performance, mastery, or work approach orientation. The students' expressed work approach motives that did not clearly fit into one orientation. Potentially, each work motive was either an expression of the student's mastery orientation, performance orientation, or a new orientation called *work approach orientation*. No researchers have discussed the idea of a *work approach orientation* that I would describe as a students' drive to approach work for the underlying reason of feeling satisfied to complete work. For example, a student may want "to be efficient" to master the content (i.e., mastery approach), to get a good grade (i.e., performance approach), or to feel the accomplishment from getting things done (i.e., work approach orientation).

Of note, some students seemed to enjoy the simple satisfaction of completing things. During data analysis, I pondered on whether certain motives were the expression of a *work approach orientation*. Many of the students appeared to enjoy crossing items off their to-do list. In fact, Rick told Linda,

> Rick*: …from the moment I wake up I'm like in a panic. You know? First thing I do when I wake up in the morning is check my email.*
> Linda*: Mm-hmm (affirmative).*
> Rick: *Like that's what, that's the first thing and I've been doing that for the last four years, four and a half years.*
> Linda*: Oh my goodness.*
> Rick: *Uh, on my phone. I check my email. When I get up, it's like my eyes are like this and I'm checking my email to see if there's anything urgent, anything happen. And I start reading the news to see what's happened. Well they, they aim at or summaries they send*

out in the mornings.

Linda: *Mm-hmm (affirmative).*

Rick: *Um, and then it's kinda like that up until I go to bed at night. And it's like repeat, repeat, repeat. And sometimes I think I was happier in a different era of my life. Um, there's a balance. I think I need to exert a certain amount of energy a day-*

Linda: *Mm-hmm (affirmative).*

Rick: *Or else it makes me unhappy.*

Rick went on to say that he liked accomplishing things, being occupied, and had a bittersweet relationship with work. In other interactions, I observed Rick make mastery orientation statements and his peers thought he worked hard to impress the professors, yet in the excerpt he described an internal drive to be busy for busyness sake. On the other hand, Rick's described drive could be the byproduct of wanting to beat a normative standard such as being busier than the majority (i.e., performance orientation).

In certain situations, I held a higher level of confidence that motives originated from a performance orientation. At the end of the semester, as students voiced how tired they were, their common call to the group was "let's be efficient" or "let's just get this done." In these situations, the students were most likely not approaching the work to learn (i.e., mastery orientation) or for the simple satisfaction of completing the work (i.e., work approach orientation). Thus, the work approach motives in these situations were most likely expressions from students' performance orientation.

Work avoidance motives – Either work avoidance or performance orientations. The work avoidance motive is not to be confused with a deeper work avoidance goal orientation, although a work avoidance motive could originate from a work avoidance goal orientation or a performance orientation. Originally, work avoidance orientations were not included in this study, because I did not expect students from this population to hold work avoidance orientations. Work avoidance has been characterized as the lack of an achievement goal and academic

alienation (Elliot, 1999). Success to a student with a work avoidance orientation is doing the minimum amount of work, effort, and challenge. Dowson and McInerney (2001) conducted interviews and observations to characterize work avoidance goals. They described that behaviorally, these students used effort minimization strategies, cognitively, they choose the easiest path, and emotionally, they felt bored, lazy, or inertia.

In Table 11, the work avoidance motive example, the students in the low self-rated group decided not to complete the group work assignment during their assigned time, but, instead completed other school work or took a nap. This decision was based on the students' judgment of what was most valuable to them during that time period, therefore I could not conclude if the students' held a work avoidance orientation for this project or were avoiding work to regulate their well-being, emotions, or motivation for the other course.

Overall, I was unable to capture a simple representation of students' achievement goal orientations through the analysis of their statements. However, by breaking down achievement goal orientations into motives, I was able to represent the reasons for why students were engaging in the task (i.e., motives). In this data set, students engaged in behaviors to get a good grade, get a good job, beat other small groups, learn, avoid work, be efficient, just get done, improve performance, and put forth a good effort. Of these motives, some were clearly categorized into performance or mastery orientations, whereas others depended on students' deeper motives that were not always expressed in students' statements. I also found limited support for the presence of a work approach orientation.

Characterizing the regulation of motivational task beliefs, values, and goals. In this subsection, I address **RQ2 part B**: *What types of challenges and stimulus events invited what types of regulation statements and strategies for the regulation of motivational task beliefs,*

values, and goals? In alignment with other reports and theories of motivation regulation in collaborative learning (Hadwin et al., 2018; Järvelä & Järvenoja, 2011), the students regulated their own, others, and the group's motivational task beliefs, values, and goals. In chapter two, I formulated the following five types of motivation regulation facets from individual motivation regulation research (Boekaerts, 1996; Wolters & Benzon, 2013) and theory (Hadwin et al., 2018): 1) create a motivation intention, 2) construct meta-motivational knowledge, 3) monitoring motivation state, beliefs, or knowledge, 4) intentionally enacts a strategy to overcome a motivation challenge (i.e., control), 5) reflect on motivation state, beliefs, or knowledge. Within the motivational task beliefs, values, and goals domain, the students did not create any motivation intentions nor construct meta-motivational knowledge about their motivational task, beliefs, values, or goals. The students did monitor, control, and reflect on their motivational task beliefs, values, and goals as depicted in Table 12 and 13.

The monitoring and reflecting on motivational task beliefs, values, and goals was a rare event for both groups. The only types of monitoring and reflecting that emerged was the monitoring and reflection upon competence perceptions and achievement motives. For example, both group's members would ask each other how confident they felt about their current progress. Also, the high self-rated group monitored and reflected upon each other's achievement motives. I further explore those interactions in the following emerging theme and the next section on group differences.

Of the five motivation regulation facets, they predominantly used strategies to meet task demands or overcome motivational challenges. When faced with a challenge or task demands, the students utilized strategies to control their own and other's task value, competence perceptions, attributions, task difficulty beliefs, and achievement goal orientations. For example,

in one of the first group meetings, a student told her group members “we can do this!” In this example, the student was attempting to control her group member’s competence perceptions through social persuasion.

I paired each regulation strategy with the challenge type the students were regulating. In the example of the student saying, “we can do this,” I noted that the student initiated this regulation due to task demands since the student said it after looking at the project requirements. If the student said, “we can do this” in response to another student saying, “we are going to struggle with this,” then I would have paired the statement with the challenge type “low competence perceptions.”

The students used regulation strategies to control for nine different types of motivation challenges or stimulus events. The stimulus events included task demands, outside factors, bad feedback or performance, lack of feedback from the course. The motivational challenges included low value, interest, control, or competence perceptions. Motivational challenges also included high competence perceptions and differences in achievement goal orientations.

Stimulus events. When I began coding, I planned to open code for motivational challenge types. However, I discovered that students also regulated their motivational task beliefs, values, and goals in response to task demands and other stimulus events. The stimulus events included task demands, outside factors, bad feedback or performance, and lack of feedback from the course. In upcoming sections, I review how the groups differed in their response to a shared stimulus event, a lack of feedback from the course. I also outline in an upcoming section how the low self-rated group regulated their motivation following poor feedback. In this section, I concentrate on strategy types that both groups used to characterize how students regulated their motivational task beliefs, values, and goals following a stimulus event. I concentrate on

examples both groups used to not overlap with the results section outlining the differences between the groups.

Table 12

How Students Regulated Motivational Task Beliefs, Values, and Goals Following ***Stimulus Events***

Stimulus Events	Regulation Facet and Sub-Facet	Regulation Strategy	Representative Student Quotes
Task demands	Control – Managed task value	Aligned personal interests	"I'm just choosing ones [parts of the task] that are interesting to me"
		Asked professor about the importance of task achievement	"Does that [getting a high pass] matter? Like… do you [to facilitator] know?"
	Monitor – Monitored competence perceptions	Asked the group how confident they feel	Student 1: "Do we feel okay about stuff? Student 2: "Yeah, we feel great"
	Control - Competence perceptions management	Social persuasion of competence	"We can do this"
		Compared performance with other groups	"I can tell from some of the groups that they're definitely in that just get it done mode."
		Proximal goal setting (i.e., break up the task)	"We can establish short-term goals for all of our meetings"
Outside factor (e.g., job, conference)	Control - Managed task value	Increased topic relevancy	"We had [project topic] actually on our [other course] test.
Bad feedback	Control – Managed achievement goal orientations	Supported a performance goal orientation	"We still passed" "And they still gave us an 85, so …whatever, there."
	Control – Attribution manipulation	Advocated for internal or external attribution	"Well, I wonder who gave feedback"
		Advocated for controllable or uncontrollable attribution	"If they thought lack of detail was a problem for this one, the next one they're gonna be like you went into way to much detail"
Lack of feedback from the course	Control – Competence perceptions management	Social persuasion of competence	"Guys, we're gonna pass"
		Compared predicted performance with other groups predicted performance	"Do you think these other teams are putting in [our] level of, like, quality?"

In response to task demands, both groups monitored their group members' competence perceptions and controlled for them. For example, one student said that the project might take a while when another responded, "No, it fine. We can break that down." In this example, the student is controlling the group's competence perceptions by using the strategy, proximal goal setting (Wolters, 1998). Also, to improve the intrinsic value of the task, both groups decided to split up the work according to their personal interests. For example, one student asked the group, "okay. So everyone divide up, okay, does anyone have a particular one of our problems that they just wanna pick?"

Both groups had instances of a student regulating their group member's task value beliefs due to outside factors. In one group, a student came back from a conference and shared how their project topic became relevant at the conference. In the other group, Jason and Viola discussed how they both saw evidence of their assigned project topic at their jobs. They choose to share their insights with the rest of the group. During this discussion, I observed that Don's interest peaked.

Don:	*It's, I was just going to say cool that you guys get to see it in practice.*
Viola:	*Yeah?*
Don:	*Did you look at it, and you were like "Oh, this is like what we're doing…"*
Viola:	*Yea, and I mean, the other thing was, like, it was, you know, a private website that, like, my pharmacist [boss] knew, like, to go to and I was just, like, I never even.*
Don:	*Yeah.*
Viola:	*That was the first time I had any experience with it, and I was like, well.*
Jason:	*Oh, yeah, that's another thing you've found, because someone walks in your door with [redacted, related to project topic] and you're just like "Wha!"*

In this interaction, Viola and Jason were reflecting on how their jobs increased their relevancy beliefs for the project task. Their externalized relevancy beliefs appeared to integrate into Don's

own relevancy beliefs even though he has not seen their project topic in the workplace.

Motivation challenges. In addition to regulating their motivational task beliefs, values, and goals due to stimulus events, the students also regulated these motivation constructs in response to motivation challenges. I open coded and then categorized the motivation challenges into the following categories: 1) low task value, 2) low control, with or without low competence perceptions, 3) low competence perceptions, 4) high competence perceptions, and 5) differences in achievement goal orientations. Overall, the motivation challenges were either due to a motivation construct being too high, too low, and too diverse in the group.

In response to low task value, the students controlled for sub-types of task value; either attempting to increase intrinsic, utility, or attainment value. In the following example, Liz attempts to improve intrinsic task value, which puts Jason's attainment value at risk.

Jason:	*The thing is is everybody's just gonna be hating life the entire time.[during the final oral presentations]*
Liz:	*I feel as though it'll be funny if we make it funny.*
Jason:	*We don't have a funny topic*
Liz:	*No, that's the point. We can all have British accents, we could do something silly, like that*
Jeff:	*That is not professional pitch. Don't… Don't do that*
Liz:	*Don't knock my British accent*
Jason:	*I'm... I'm not... I'm not criticizing your British accent, I'm saying that maybe professionalism might be the best route to go for a grade... for a decent grade, just considering who we're presenting... There's gonna be, like, [professor] and other people there. We're going to expect...*

In the first line, Jason expressed low intrinsic value for the final oral presentation. In response, Liz attempted to increase the intrinsic value by using humor. However, Jason disagreed with her strategy because he valued task attainment.

In particular, the low self-rated group expressed a belief that they lacked control over their group's performance. In response, members of the low self-rated group decreased task

value and manipulated their attributions towards external factors (e.g., the grader). In the following example, Jason claimed that the group has no control over attaining a higher grade. Then he voiced a decreased task value to his other group members.

Jason:	*Well it seems like we can only get an 85 so ... not that it matters. I didn't even -*
Viola:	*I agree*
Jason:	*We got, we gotta grade and we didn't get uh ... I didn't look to see if we had any feedback because it was so useless last time*

The high self-rated group did not express low control beliefs for the group task, but did have one conversation talking about other courses. One student said they were stuck (i.e., low control) at a "B" grade and the other students responded by assuring them that grades did not matter (i.e., decreased value).

In response to situations when group members expressed low competence perceptions for task, both groups' members would persuade that group member that the activity was easy. For example, one student said they were not good with technology to which the other students assured them that the technology was easy. Group members would also persuade each other of their competence. For example, one student said they were nervous about presenting in front of the class. Then their group mate replied, "No, but you did so well presenting yourself here."

Table 13

How Students Regulated Motivational Task Beliefs, Values, and Goals Following ***Motivation Challenges***

Motivation Challenges	Regulation Facet and Sub-Facet	Regulation Strategy	Representative Student Quotes
Low task value	Control - Managed task value	Increased intrinsic value	"I feel as though it'll be funny if we make it funny" "In order to increase group energy, we sometimes purposefully get off topic to relax and not be so serious"
		Social persuasion of task utility	"I think you walk away from it [the project], having learned a lot"
		Stressed importance of attainment	"In order to get a passing grade in this assignment, I think we need to"
Low control (with or without low competence perceptions)	Control - Managed task value	Decreased importance of attainment by framing it in the "bigger picture"	"Like I've now, we've, I've had enough interaction with like actual people and like in pharmacy they're like, it's like [honor society and grades] doesn't matter"
		Advocated that the task or achievement has low utility	"I didn't look to see if we had any feedback because it was so useless last time."
	Monitoring – Monitored Control	Monitored low control beliefs	"At this point, this is a com-… like.. I don't know how to get a high pass in this class, so"
	Control - Attribution manipulation	Shifted causal attribution to external factor (e.g., feedback giver)	"Did they realize we had a page limit?!?"
Low competence perceptions	Control – Managed task difficulty perceptions	Promoted that the activity was easy	"It's so easy"
	Control – Competence perceptions management	Social persuasion of competence	"Believe in yourself" "You did so well"

Motivation Challenges	Regulation Facet and Sub-Facet	Regulation Strategy	Representative Student Quotes
Differences in achievement goal orientations	Monitoring – Monitored achievement goal orientations	Monitored personal reasons for task achievement	"I want to put out a good product, I don't want to just have it done. I want to have it done, have it be innovative."
		Monitored group members reasons for task achievement	"I'm kind of curious to see where you guys stand on [project expectations] right now"
	Control - Managed achievement goal orientations	Built agreement for a team achievement goal orientation	Linda: Are we in it to win it? Rick: That's yours [to Linda], so you want to win? Linda: I don't really matter. I just would like to put forth a good effort. Rick: Put forth a good effort, okay. Um. Brett: I mean I think we're all on that same page. Linda: Yeah. Brett: I don't think that any of us like need to win, or whatever. I don't think of it as a winning thing.
		Aligned team effort with a team achievement goal orientation	"I think, the way I see it now is like pulling from Mary and maybe having one conversation or so with someone. That would be a good effort."
		Promote a mastery goal orientation (e.g., "to learn")	"I'm over here saying no no no let's back up, let's talk, let's spend two and half hours talking about things."
	Reflection - Reflected on achievement goal orientations	Reflected on differences in group members orientation	One student told another he wanted to put forth a good product, but he believed three of their group members just wanted to get the task done.
		Reflected on strategies to control differences in group members orientations	"One of the things I try and stop whenever I see it happening is just assignment-driven activities"

Emergent theme: Students negotiated and regulated towards their goal orientation and standards. In the high self-rated group, the students not only regulated their achievement goal orientations, but regulated *towards* their achievement goal orientation. In this manner, the students' goal orientations were a driving factor for other types of negotiation and regulation. In this section, I will outline an emergent theme: students negotiate and regulate towards their goal orientations and standards.

The high self-rated group had differences in individual's goal orientations and standards. In fact, several group members consistently rated "differences in priorities and expectations" as a challenge in Collabucate. Also, a private conversation between Rick and Linda showcased how members of the group were aware of the differences.

Rick:	*I feel like, you know, if I were to just guess, they gave us a problem...*
Linda:	*Get it done [points to Amy's chair], get it done [points to Mary's chair], get it done [points to Brett's chair].*
Rick:	*Oh you mean them?*
Linda:	*Yeah*
Rick:	*Oh yeah yeah yeah yeah, that's exactly right, yeah. Which is like...*
Linda:	*Distressing in some ways. I want to put out a good product, I don't want to just have it done. I want to have it done, have it be innovative, have it be...*
Rick:	*Right, so same.*

In this excerpt, Rick and Linda established that they both have a mastery orientation towards the project and believed the other group members have a performance-like "get it done" orientation. They also revealed that they find the differences to be problematic. Rick characterized his behavior to Linda as "I'm over here saying no no no let's back up, let's talk, let's spend two and half hours talking about things," whereas the other three group members wanted to just get the project completed. Rick also told Linda that he became aware of these differences during meeting one when he floated the idea of working on Sundays instead of the regular group

meeting time. Using Rick and Linda's perceptions of the group member's goal orientation, I analyzed and synthesized within group differences between Rick and Linda versus Mary, Brett, and Amy. Rick and Linda consistently took on lead roles, put forth more effort, regulated the group by setting up group expectations and goals, and advocated for the task's value. For Brett, Mary, and Amy, they unintentionally joked about work avoidance. For example, they would joke about leaving early or just turning in the assignment, especially when Rick was absent one day. As for regulation, they attempted to regulate Rick's standards by telling him consistently to "calm down" and would regulate the group's effort by saying "let's just get this done" or "get this done so we can leave early." Also, Brett would probe the professor for information on how much grades mattered and how their work compared to other groups.

In group discussions, the high self-rated group members would come to a shared agreement whether to put forth high or low levels of effort. However, the members continued to rate "differences in priorities and expectations" as a motivation challenge until the end. In this perceived tug-o-war game between the two sub-groups, they took turns negotiating and regulating the group towards their orientation and standards. At certain times, the group would go beyond course expectations by conducting additional interviews of experts or teaching each other project content, while other times they would simply complete what was necessary to achieve a high mark.

The emergence of group mastery or performance behavior was determined by the current power dynamics of the group and the effectiveness of their negotiation skills and regulation strategies. Rick held more power in the group than Linda since he would take on the leadership role of directing the group. Therefore, his absence afforded more performance behavior in the group than instances when Linda was absent. Rick and Mary were also savvier

in their negotiation skills and regulation strategies. Early on, Rick would build shared agreement in the group to complete mastery behaviors (e.g., extra effort activities). Later, to preempt attempts by the performance minded students to tell him to "calm down," he would ask the group to complete something at a high standard, quickly followed by him saying, "I know, Rick, calm down." By him making fun of himself, this would deescalate the pressure the performance minded students felt by his requests. When faced with requests to go beyond course expectations, Mary would, at times, make excuses. For example, she had outside obligations. She also started to spontaneously share with the group her list of outside obligations, possibly to prevent future requests. In one particular group meeting, Rick was absent and the group was engaged in frequent off-task talk. Linda attempted to regulate the group's task engagement by telling Mary to "focus" and giving her a stern look. Mary apologized, made an excuse, and then later engaged Linda in an off-task topic that she knew Linda was sure to enjoy, because Linda had talked about it previously.

In addition to power dynamics and strategy use, the students' need to belong (Juvonen, 2006) attuned the group's behavior. Returning to Rick and Linda's private conversation, Rick implied that being liked was more important to him than regulating the group. Rick told Linda, "If this had been a different group, I would have called [Mary] out, ... but I'm not trying to make enemies, especially since she already doesn't like love me" and "I'm always hesitant because I'm already not loved by her group." By "her group," Rick meant that Mary was popular and had a friend group with a high social status in their cohort. Rick's need to be liked by his peers and Mary's social capital prevented the group from ever fully adopting a group-level orientation towards mastery or performance.

In substitute for more direct communication and group regulation, Rick and Linda

would slyly tease Mary to limit her social capital. Linda once teased her about her grammar. In another instance, Rick either unintentionally expressed his frustration with Mary or intentionally positioned her as unlikeable, which was counter to her identity.

> Mary*: I think you would hate me on a Sunday afternoon.*
> Rick: *Even more?*
> Mary*: Than- (Mary laughs uncomfortably, Brett laughs)*
> Rick: *Sorry, sorry*
> Mary: *I guess even more (laughter)*

After this exchange, Mary appeared unsettled for five minutes and Rick complimented her later as a recovery.

Individual member's achievement goal orientations affected the group's behavior that could not be explained by the sum of it's parts, but by negotiated moves tugging the group towards performance or mastery behavior. At times, the moves were obvious and intentional; while at others, it was subtle and effortless. The students either swayed the group as whole or jockeyed for power before moving the group towards their own orientation and standards. When it came to completing course requirements, both the mastery and performance minded students were aligned to propel the group forward. The tug-o-war emerged during decision points to either simply meet course requirements or expend extra effort.

Overall, the students negotiated and regulated towards their achievement goal orientation as evident from the differences between Rick and Linda's (i.e., mastery orientation) compared to Mary, Don, and Amy's (i.e., performance orientation) statements and behavior. The mastery students would put forth more effort while the performance students maintained course requirements. Each set of students would attempt to undermine the other's actions or would build agreement in the group. Therefore, the group never established a group-level goal orientation for mastery or performance.

Exploring differences between the two groups' negotiation and regulation of motivational task beliefs, values, and goals. In this subsection, I address **RQ2 part C**: *what differences existed in motivational task beliefs, values, goals, and regulation between the two groups?* Now that motivational task beliefs, values, and goals have been characterized, I first discuss how the two groups differed in their *negotiation* of these constructs. Then, I review how the two groups differed in their *regulation* of motivational task beliefs, values, and goals.

Differences in negotiation. Table 14 is a matrix of how the two groups differed in their negotiation of task beliefs and values, competence perceptions, causal attributions, and motives and goal orientations. Of note, the high self-rated group had no instances of discussing causal attributions. For each motivation construct (e.g., competence perceptions), I provide the types of beliefs, values, and goals the group negotiated to a shared agreement (i.e., co-construction outcome). Then, I include the types of beliefs, values, or goals that the group negotiated to only an established agreement. Established agreement was defined by one student externalizing their belief, value, or goal and the other members taking up their statement by agreeing with them but not elaborating on their comment. Since I realized in my data analysis that it was important to note the student who first externalized the comment, I included the name of the student in Table 14. If the category is followed by a student's name, then this student was the one who first externalized the statement and the others simply agreed with it. Lastly, I included the types of motivational task beliefs, values, and goals that were externalized by a student, but then the group either disagreed with their statement or ignored their statement (i.e., lack of group agreement).

Overall, the two groups were similar in their task beliefs and values. The two groups both had a shared belief that the task was easy and contained group members with varying levels of

task value beliefs. but differed in their competence perceptions and motives and achievement goal orientations.

As far as competence perceptions, both groups were confident in their group's performance at the beginning of the project. However, after the low self-rated group received poor feedback and a midrange grade, Jason became a spokesperson for low competence beliefs and expectations for success, whereas Liz became more vocal in her attempts to encourage the group. From the beginning of the task, Liz would tell her group, "we can do this" and "we're going to win." Then, after the group received poor feedback on their assignment, Jason told the group, "we ain't winning." Jason also said, "I mean, at this point, I don't know how to get a high pass in this class."

Table 14

Differences Between the Groups' Negotiation of Motivational Task Beliefs, Values, and Goals

Low Self-Rated Group	High Self-Rated Group
Task-based beliefs and values	
Shared Agreement The task is easy Lack of task feedback has opportunity costs Task costs time away from other courses Task is confusing, which costs effort Project topic relevant to current and future job	Shared Agreement The task is easy Not expecting valuable feedback Listening to other group's presentations would cost time
Established Agreement [Initiator] Task is low value compared to other courses [Viola] Topic is not fun, lame [Don]	Established Agreement [Initiator] The task is too structured [Linda] The task has future utility [Rick] The task will take a long time [Brett]
Lack of Group Agreement [Initiator] Task as a "curve ball" [Viola] To do a good job on the task, it will take awhile [Viola] The task has utility [Liz] Don't care, [Don]	Lack of Group Agreement [Initiator] Task as "Creative work" [Rick] Don't care [Brett]

Competence perception statements

Shared Agreement
- Our work looks good (earlier)*
- Not confident in getting a high pass (later)*

Established Agreement [Initiator]
- We are not winning [Jason] (later)
- We are going to win [Liz] (earlier)

Established Agreement [Initiator]
- Confident in group performance, [Rick]

Lack of Group Agreement [Initiator]
- Confident in group performance [Liz]
- Not confident in group performance [Viola and Jason]

Causal attribution statements

Lack of Group Agreement [Initiator]
- Project feedback due to internal, controllable, non-stable causes [Viola]
- Project feedback due to external, uncontrollable, stable causes [Jason]

Achievement goal orientation statements and motives

Shared Agreement
- To get a midrange grade (later)
- To just get done

Shared Agreement
- To put forth good effort

Established Agreement [Initiator]
- To get a high pass [Mary]
- To just get it done [Brett]

Lack of Group Agreement [Initiator]
- To beat others [Liz]
- To avoid work [Liz and Don]

Lack of Group Agreement [Initiator]
- To learn [Rick and Linda]
- Don't care about getting high pass [Brett and Rick]
- Don't care [Mary]

*Earlier vs. later – first half of group project vs. later half

The most profound difference in the two group's motivational task beliefs, values, and goals were the group's motives and achievement goal orientations. I previously explored the high self-rated group's achievement goal orientation in the emerging theme "students negotiated and regulated towards their goal orientation and standards." Overall, the high self-rated group appeared divided in their goal orientations with two members, Rick and Linda, voicing mastery goal orientations, Brett and Mary displaying performance orientated behavior, and Amy

remaining largely silent on her task beliefs, values, and goals. However, early in the project, the high self-rated group crafted a shared motive to put forth good effort in the task.

Compared to the high-self rated group, the low self-rated group negotiated a shared desire to get the midrange grade and just get the project completed. After the low self-rated group received their poor feedback on their assignment, the group negotiated a shared motive to aim for a midrange grade. Don replied, “it’s just pass fail.” Viola responded with, “that’s more within passing range, I don’t really care” and Jason said, “they still gave us an 85, so…whatever…there.” This type of motive was categorized as a performance approach. Also, throughout the project, each of the low-self rated group members voiced a motive to just get the project completed. For example, Liz once said “all right, so we can go ahead and finish this thing,” which Don agreed to by saying, “let’s keep hammering this out” and Viola said, “I mean, I think this is enough.”

The high self-rated group had one group member, Brett, who shared the low self-rated group’s desire to get the project completed with a passing grade. When Mary talked about wanting a high pass, Brett replied, “I don’t really care about that.” However, the rest of Brett’s group nodded their head along with Mary’s comment.

Differences in regulation. Since the two groups’ negotiation of task beliefs, values, and goals differed, the two groups’ regulation of task beliefs, values, and goals differed in types of challenges and stimulus events they had to regulate. As previously described in the emergent theme, the high self-rated group was challenged by differences in their individual achievement goal orientation. There was further evidence of the group’s challenge in their Collabucate responses. Over the course of six time points, the five group members individually selected “differences in priorities and expectations” 21 times as a salient motivation challenge, compared

to 4 or 5 times for the other related motivation challenges (see Table 15). In response, the high self-rated group monitored and reflected upon their differences in motives. They also attempted to manage each other's orientations and motives.

Table 15

Collabucate Motivation Challenge Selections Per Group Over Six Time Points

Collabucate Motivation Challenge Selection Choice	Low Self-Rated Group (N = 4 members) (% of possible ratings)*	High Self-Rated Group (N = 5 members) (% of possible ratings)*
Our interest in the topic	9 (38%)	4 (13%)
Believing we will do well	3 (13%)	5 (17%)
Differences in priorities and expectations	10 (42%)	21 (70%)

*Percent of possible ratings included six times points for each group member. For example, 6 times points x 4 group members = 24 time points.

Due to poor feedback and a midrange grade, the low self-rated group was challenged by that situation and subsequent low competence perceptions. As a group, the low self-rated group responded to their poor feedback by relying on their performance orientation (e.g., "we still passed") and attempting to manipulate each other's their attributions (Wolters & Benzon, 2013). As previously described in the causal attributions section, their attempt to manipulate each other's attributions results in a lack of group agreement. Overall, the group lacked a coordinated response to the feedback and grade, letting each individual member choose their own path. Liz mentioned that talking about the feedback made her no longer feel motivated in the moment, but she continued to maintain high positivity. During one of the last group meetings, Liz said, "we should believe in our idea. I would put money on it" to which Viola responded in disagreement by burying her face into her hands. Jason appeared to bundle these events into his overall semester experience. Before receiving the poor feedback and after receiving positive verbal

feedback from the facilitator, Jason exclaimed how great it was that the group was doing well since he was doing poorly in other courses. Then after the poor feedback, he sounded defeated and hopeless claiming that no matter how hard he works, he can not seem to improve his grades in any courses. For Viola, she responded by devaluing the task (e.g., “it’s pass fail”), becoming more task orientated (e.g., “let’s just get this done”), and supporting her motive to get a passing grade. Lastly, Don skipped the last meeting. His decision to skip may or may not have been a response to the group’s performance.

When both groups encountered the challenge of not receiving timely feedback on their previous assignments, the two groups managed the situation differently. For the low self-rated group, this situation affected their willingness to put forth high effort on the project. While working, Jason complained about not receiving any grades or feedback. The low self-rated group did not regulate their motivational states and beliefs, losing the opportunity to actively manage the situation. In a conversation with a researcher, the group told the researcher the following:

Jason	*I almost think a big part of when we said there's no skin in the game is we don't even know how we're doing because we're not getting feedback on these assignments, so we don't know what room we have for ... We don't know if we're doing it wrong, doing it right ...*
Don	*That's a great point.*
Jason	*So we have no real ... There's no yardstick for us to measure our performance by.*
Liz	*By anything. In anything.*

In this interaction, the students in the low self-rated group agreed that they could not improve their performance and meet standards due to the lack of course feedback. Their group either shared an underlying belief that the assignment graders were the only ones who could grant the authority to say “you are doing well” or the group members only cared about getting a passable grade and did not care about learning. During this interaction, Jason went on to elaborate the

following:

> Jason *It's hard to be driven to improve when you don't know whether or not you're already doing well or doing terrible. I guess if we got a really atrocious grade on the first assignment, we might be more driven, but we got an acceptable grade on the assignment we submitted a month ago. That's the last grade we really got back.*

Jason's comment provided further evidence that the group shared a performance approach with a standard of achieving a passable grade. Due to the group's performance approach, they found the lack of grades and feedback to be challenging.

In contrast, the high self-rated group begun the situation similar to the low self-rated group with one group member, Linda, complaining about situation. However, Rick stepped in to bolster the group's competence perceptions.

> Rick: *I mean, I assume it [last assignment] was probably good. I read it, I mean, you know. (laughter). Real good. It's pretty good.*
> Linda*: I know now*
> Rick: *-regardless of what the comments were on it*

He indicated that the group doesn't need to worry about an *external* (e.g., grader) measurement of their performance (i.e., grades and feedback), and should, instead, rely on his *internal* measurement of performance

Summary of group differences. Overall, both groups shared a similar mix of task beliefs, task values, and competence perceptions at the beginning of the project. After the low self-rated group received poor feedback, some members of the group expressed low confidence in their group and devalued the task. Also, the low self-rated group negotiated motives to get a midrange grade and just get the project done (i.e., performance orientation), whereas the high self-rated group had some members with a mastery orientation and some members with a performance orientation. As far as differences in their regulation, the two groups had different stimulus events and motivation challenges to regulate. The high self-rated group had to manage their differences

in achievement goal orientations, whereas the low self-rated group all shared a performance orientation. Also, the low self-rated group had to regulate their motivational task beliefs, values, and goals after receiving poor feedback. In addition to different stimulus events and motivational challenges, the two groups differed in their response to the same stimulus event; a lack of feedback and grades from the course. The low self-rated group failed to regulate their motivation, whereas the high self-rated group relied on their internal measure of performance.

Motivational Social Beliefs, Value, and Goals

In the motivational social beliefs, values, and goal section, I address **RQ3**: *how did motivational social beliefs, values, and, goals occur in two extreme cases of collaborative learning groups?* In the first sub-section, I characterize the types and sub-types of motivational social beliefs, values, and goals emerged in both groups. In the second sub-section, I characterize what types of challenges and stimulus events invited both groups to participate in what types of regulation of motivational social beliefs, values, and goals. In the last sub-section, I compare between how the two groups differed in their negotiation and regulation motivational social beliefs, values, goals.

Characterizing types of motivational social beliefs, values, and goals. In this subsection, I address **RQ3 part A**: *what types of motivational social beliefs, values, and goal emerged?* I coded for the presence of the following types of motivational task beliefs, values, and goals: 1) beliefs or values about the self, 2) beliefs or values about peers, 3) beliefs or values about the group, and 4) social goal orientations. Under each type of motivational social belief, value, and goal, I coded for subtypes that are described in results tables. For particularly complex or novel sub-types, I will provide representative and exemplary quotes and interpretations.

Beliefs or values about the self. The students made seven specific types of statements

about themselves all related to their identity development (see Table 16). The "identity" category related to direct labels students assigned themselves. The students also presented their identity when they voiced their values, preferences, described their ways of thinking, doing, being, made predictions about themselves, and explained their history. Of all the targets (self, peer, task, etc.), the students made the most statements about themselves. Therefore, working with others afforded the frequent expression of identity beliefs for these students. For example, students would say "I like to visualize" and "I'm still pretty young."

The students discussed their identity beliefs as reasons for ideas, approaches, and behaviors or as a comparison to their peers. On one occasion, a student explained their lack of engagement due to their "attention span which has a 20 minute interval." In another example, a student explained to their group that they were picking one aspect of the group project "because I'm all about the patients." The students also discussed their identity in general terms, within their cohort, or narrowly within the group (i.e., practice-linked identities). For example, Linda told Rick he was the "front man" and she was the "background manager" of the project group.

Of interest, the students used *self-predictions* to judge their peers. For example, Rick explained that he negatively judged Mary because she did not teach the group her background knowledge. He said that, if he was Mary, he would have made a presentation for the group on day one. In the self-rated group, Liz also used her own identity as a measuring stick for her peers. She told Jason and Viola that she disliked Don because she is very empathetic and cares for her patients, whereas she does not believe Don shares these traits and values.

Table 16

Types of Beliefs or Values about the Self

Types of Beliefs or Values About the Self	Example Student Quote(s)
My values and preferences	"I like to visualize" "I try to have substance.. and some sort of goal" "I ascribe to radical candor"
Ways of thinking, doing, and being	"That's the way I need to think about it. I can't just vomit stuff out." "I'm always hesitant" "I can be that overbearing person, I try not to be."
Self-predictions	"I would have made a presentation on day one."
History	"I never grew up playing with legos. I think that shows" "When I was younger, I used to [practice creativity] daily"
Negative identity	"I'm scatterbrained, I guess" "I'm technologically backwards"
Positive identity	"I'm still pretty young" "I'm not dumb"
Practice-linked identity	"I'm a [course] advocate, if you haven't noticed" "I'm the stage manager"

Beliefs or values about peers. The students made seven specific types of belief statements about their peers. The types of statements, displayed in Table 17, fit into categories that are traditionally associated with task beliefs including task difficulty and task value. When students were present or absent, their peers would discuss whether they were a difficult, valuable, or enjoyable group member.

Peer conflict arose whenever a student judged another student's behavior to violate a peer norm *and* they had attributed the cause of the behavior to a controllable cause (i.e., the other student's fault). The intensity of the peer conflict increased if the behavior had cost them effort or was attributed to a stable cause (e.g., their personality). *Peer norms* are socially constructed behavioral expectations or values of a group (Hamm et al., 2011), whereas *peer costs* are a new construct that emerged from this data. Similar to task costs, peers costs are when another group member cost students time, effort, or emotions (i.e., peer costs). Similar to causal attributions,

interpersonal causal attributions (Juvonen & Weiner, 1993) are attributions that people create for others' behavior. Juvonen and Weiner (1993) argued that when a student attributes a peers' behaviors as being intentional or uncontrollable, influences how they feel about their peers, which in turn, influences how they interact with their peers. I found evidence in this study to support Juvonen and Weiner's claim in collaborative learning. Peer norms, peer costs, and interpersonal attributions interacted to create varying levels of peer conflict in collaborative learning. The following interaction was one of the most intense and clearest examples. The interaction took place during the last meeting for the low self-rated group. Don decided to skip the group meeting to travel for social reasons.

Jason:	*I have an absentee group member [Don] that I am actually pretty pissed off about.*
Liz:	*Well, yeah,*
Viola:	*Like he might have thought we were done for tomorrow, but we're not, we haven't done anything. Oh, okay.*
Jason:	*That's why I'm a little cross. He did propose, "but oh yeah, we've only done this amount of stuff. Here you go, guys." It's due tomorrow, and you want to go spend time [out of town] during class time. We care.*

There was greater peer conflict whenever the behavior cost another student time, effort, or emotions. In this situation, the students did not believe it was fair for Don to miss the group meeting before the assignment was due. This frustrated them, because they believed he was relying on them to finish the work. They also attributed his behavior to an in-control cause. If Don would have been gone due to an uncontrollable cause (e.g., car accident), then the group would have likely not have been frustrated with him. However, he chose to miss the group meeting for a social reason.

Table 17

Types of Beliefs or Values about Peers

Types of Beliefs or Values About Peers	Example Student Quote(s)
Peer Difficulty	"Mary is difficult" "She is the most challenging"
Peer Value	"We need Brett there."
Peer Costs	"She uploaded them [wrong].. so I had to go find them all"
Peer Intrinsic Enjoyment	"We enjoy your company"
Interpersonal Attributions	"He's like 'it was a prior engagement.' I was like 'get your shit done before."
Types of attributions controllable vs. uncontrollable Stable vs. non-stable	"You don't have to go to [social event]" (e.g., in-control, internal, non-stable)
Internal vs. external	"I don't trust him" (e.g., stable, internal)
Peer Identity	"optimistic," "an extravert"
Peer Practice-linked identity	"You're the front man"

In addition to attributing Don's behavior to an in-control cause, Don's group also attributed his behavior to a stable cause. Jason told the others that this was a pattern of behavior for Don, because a similar event occurred a week prior. A week before the previous event, the group agreed to submit their parts of the assignment to Jason to compile and submit.

Jason: *Then he sends me an email like at 8:30, he's like, "Oh I'm sorry, I had to go to the movies tonight. Like prior plans. Can you submit it. I'll probably be back before like 11, so I could probably still do it." I was just like, "The fuck man?" (laughs)*
Viola: *You don't have to go to the movies.*
Jason: *No that's what, I'm, he's like, "It was a prior engagement." I was like, well get your shit done before.*
Viola: *You know what? Yeah.*
Liz: *Or, you know what, at least be courteous enough to not tell me it was a movie.*

Based on Jason's explanation, Don appeared to think the situation was out of his control (i.e.,

"prior plans"). However, his group members believed he was in-control of the situation. In the end, Don's group believed he violated a peer norm and attributed the cause to reasons that were in-control and stable. As this event occurred in the final group meeting, I was unable to observe the effects of the event on their interactions with Don. Also, the event occurred after their final Collabucate motivation ratings. However, as evident by the group's use of language, the group members became angry due to their attributions of Don's behavior.

In another example, two students in the high self-rated group, Linda and Rick, talked privately about their group member's, Mary's, past behavior. Linda said that Mary submitted her part of the assignment to Linda incorrectly. Linda seemed irritated since it cost her time to redo Mary's work. In this situation, interpersonal attributions also played a role. When Rick asked why the situation occurred, Linda implied that it was in Mary's control, because anyone was able to look the mistake and catch it. Therefore, Linda believed that Mary should have been able to look at the error and catch it (i.e., controllable cause). Linda's tone and choice of words suggested she was frustrated by her attributions to Mary's behavior.

In addition to attributions, peers assigned broad and group work specific identities to each other, for example, labeling each other with broad identities such as "extrovert." The students also labeled each other with identities within the group. Linda called Rick the "front man" of the group. Also, when Linda and Rick were both missing one day, Amy asked "where are our stars?"

Beliefs or values about the group. The students made five specific types of beliefs about their group and teamwork, in general. There were differences in how easy or hard they believed it was to work in a group. Also, the students varied in the extent to which they thought the group had utility in completing certain tasks compared to individual work. Some students believed they achieved more work at home, working individually, whereas others believed the group was ideal

for brainstorming and thinking through ideas. As the two groups varied in the types of group beliefs and values as shown in Table 18, I elaborate more on these in the upcoming section on the differences between the two group's motivational social beliefs, values, and goals.

Table 18

Types of Beliefs or Values about the Group

Types of Beliefs or Values about the Group	Example Student Quote(s)
Group difficulty	"Teamwork is hard"
Group value	"The team should be together" "that would break up the group"
Group intrinsic enjoyment	"We like each other and feel comfortable"
Group competence perceptions	"I'm thinking the caliber of what we submit to you will be alright"
Group positive identity	"Team" "Technologically high functioning" "My people"
Group negative identity	"We're the children version of an animal shelter"

Social goal orientation statements. In the original codebook, I decided not to include social goal orientations due to their unlikelihood of emerging. However, in this dataset, they were too salient to ignore. In comparison to academic reasons for students wanting to achieve (i.e., academic goal orientations), social goals are the social reasons for why students want to succeed (Urdan & Maehr, 1995) or socialize in academic situations (Allen, 1986). Social goals, similar to achievement goals, are cognitive representations of desired future outcomes (Wentzel, 2017). Students determine whether they are successful in these outcomes based on their personal satisfaction and other's social reactions. Also, similar to achievement goals, students differ in their desired standards for each goal. For example, students hold social approval goal orientations towards their peers that range from desiring general acceptance from peers to desiring close friendships (Wentzel, 2017).

We observed the students make five specific types of social goal orientation statements

applied from previous work by Dowson and McInerney (2001) and Urdan and Maehr (1995). As shown in Table 19, the students expressed orientations for social approval, social welfare, social concern, social affiliation, and social responsibility.

Table 19

Types of Social Goal Orientations

Types of Social Goal Orientations	Definitions	Representative Student Quote(s)
Social approval	To gain approval of peers or teachers (Urdan & Maehr, 1995)	"I mean I think he wants to like put this in his portfolio, to show [professor]"
Social welfare	To benefit the larger society (Urdan & Maehr, 1995)	Amy: Our, our goal is to lower total cost of care. Group: Yeah. True. (laughs) Facilitator: That's fine. That's fine. Brett: Goodwill. (laughs). Amy: Save lives. (laughs). Brett: Good karma. (laughs).
Social concern	To assist others in their academic and personal development. (Dowson & McInerney, 2001)	"I think that's one of the reasons I take it on, because I don't want anyone else to, I don't want it inflicted on anybody else, you know?"
Social affiliation	To enhance sense of belonging to a group and/or build or maintain peer relationships. (Dowson & McInerney, 2001)	"I don't want to be the only one" "it's for bonding" "that would break up the group"
Social responsibility	To adhere to social rules and role expectations (Dowson & McInerney, 2001) and/or be a "good person" (Urdan & Maehr, 1995)	Viola: Don told me to do that, and I studied for therapy instead. Jason: Don't worry about it. Viola: I'm very sorry

Social goals afforded and constrained group coordination practices and social interactions. For example, Brett (high self-rated group) showed high social concern by always asking other students about their lives and comforting them. His social concern orientation extended into the task when he said statements such as, "I don't want to hurt the group" in

reference to his individual performance. Students with a strong social concern orientation (i.e., Brett, Linda, and Liz) would comfort others, ask about their group member's well-being, and dismiss other group member's late or non-existent work. On the other hand, Don displayed a low orientation for social concern and social responsibility. Don would attend meetings late, not complete his portion of the work, and ignore his group members' emotional displays.

Social goal orientations were also the reasons why some students set high standards for achievement and persisted in the task. For example, the high self-rated group decided that Rick put forth more effort since he was "worried about his reputation." Therefore, Rick's social approval orientation negotiated his high standards and task engagement.

Also, as represented in Table 19, the high self-rated group held a social welfare goal orientation. In response to their facilitator telling them that their solution would not be profitable, the group joined in to argue that they were more concerned with the welfare of society. Also, in the low self-rated group, one student, in particular, expressed a strong social welfare orientation. Liz told her group that she preferred to work with underserved patient populations. She also selected which part of the assignment she wanted to complete based on her judgement of what solution would have the greatest societal impact.

Characterizing the regulation of motivational social beliefs, values, and goals. In this subsection, I address **RQ3 part B**: *what types of challenges and stimulus events invited what types of regulation statements and strategies for the regulation of motivational social beliefs, values, and goals?* Since the regulation of social beliefs, values, and goals were a rare event, I present every example of this phenomenon.

Overall, the students regulated their own, others, and the group's motivational social beliefs, values, and goals. In chapter two, I formulated the following five types of motivation

regulation facets from individual motivation regulation research (Boekaerts, 1996; Wolters & Benzon, 2013) and theory (Hadwin et al., 2018): 1) create a motivation intention, 2) construct meta-motivational knowledge, 3) monitoring motivation state, beliefs, or knowledge, 4) intentionally enacts a strategy to overcome a motivation challenge (i.e., control), 5) reflect on motivation state, beliefs, or knowledge. Within the motivational social beliefs, values, and goals domain, the students monitored, controlled, and reflected on their motivational social beliefs, values, and goals as depicted in Table 20.

Table 20

How Students Regulated Motivational Social Beliefs, Values, and Goals Following Motivation Challenges

Motivation Challenges	Regulation Facet and Sub-Facet	Regulation Strategy	Example From Which Group?
Negative peer beliefs	Monitor – Monitored negative peer beliefs	Monitored negative peer beliefs in private	High self-rated group
		Monitored negative peer beliefs openly	Low self-rated group
Interpersonal attributions following peer norm violation	Control – Interpersonal attribution manipulation	Planned to ask the group member in question about the attributions	Low self-rated group
	Control – Managed peer costs	Assign the peer retribution	Low self-rated group
	Control – Managed peer beliefs	Lose trust in peer if the attribution was stable	Low self-rated group
Negative group beliefs	Control – Managed negative group beliefs	Normalized and justified the source of the belief (e.g., group behavior)	Low self-rated group
		Reframed the group belief as a self belief	Low self-rated group
Differences in social goal orientations	Reflection – Reflected on social goal orientations	Reflected on the differences and reasons why the group members held different social goal orientations	High self-rated group

Similar to the task-based section, I paired regulation facets and sub-facets with the motivation challenges. The motivational challenges included negative peer beliefs, interpersonal attributions following a peer norm violation, negative group beliefs, and differences in social goal orientations. Of note, personal identity regulation was too elusive to be definitively observed. There was no evidence that the group task afforded or constrained students' identities. However, the students did discuss how other courses affected their identities. For example, one student said, "based on this [other course] grade, I'm not going to be a clinician at all." For individual students, identity served more as a source of motivation and engagement, rather than something that the students acted upon. Also, I did not identify any interactions that I believed students were intentionally managing other's identities. In a later section, I describe how students expressed what they believe are their peer's identities (e.g., extroverted). However, again, I did not believe that the students were acting upon their peer identity beliefs.

Negative peer beliefs about a peer. Both groups contained students who held negative peer beliefs about other group members. In the high self-rated group, Linda and Rick held negative peer beliefs about Mary. In the low self-rated group, Liz held negative peer beliefs about Don. I will review each peer conflict and emphasize how the students regulated their peer beliefs in each situation.

First, in the high self-rated group, I have already outlined some of the sources of the peer conflict between Mary, Rick, and Linda. Rick and Linda expressed an achievement goal orientation, whereas Mary portrayed a performance goal orientation. Also, Rick believed her standards were lower for the group task since she did not want to work on Sundays. Rick said, that Mary was "difficult" and "stuck in her thinking." Linda explained that Mary uploaded documents wrong and it cost Linda time and effort. Therefore, Rick and Linda monitored their

peer beliefs and reflected on the reasons for Mary's behavior. However, Rick decided not to regulate Mary's behavior "since she already doesn't like love me." Linda also decided against regulating Mary's behavior. When Linda shared with Rick that Mary's actions cost her time and effort, he asked her why she did not tell Mary.

Rick: *Why didn't you tell her? Of course you wouldn't tell her.*
Linda: *Well, it was Sunday and you know, yeah. I probably should've but it was easier at that point just to go find it myself instead of try to get ahold of her and try to get her to do something on a Sunday. You know, um.*

Even though Linda vented to Rick that the situation cost her time and effort, Linda made a tradeoff. She decided it was easier to redo Mary's portion of the assignment than contact Mary to fix the mistake. Therefore, the peer conflict and negative peer beliefs went uncontrolled in the high self-rated group.

In the low self-rated group, the peer conflict between Don and Liz was also monitored and reflected upon, but never controlled. However, the monitoring of peer conflict was qualitatively very different. Linda and Rick monitored their peer beliefs privately and not in the presence of Mary, whereas Liz and Don monitored their peer conflict in front of each other and their group.

Liz: *So this business stuff Don, do you just know it?*
Don *Just yep, I'm a little Warren Buffet… No, I'm not*
Liz: *I wouldn't be surprised.*
Don: *I'm not*
Liz: *Maybe that's why we don't get along*
Don: *(laughs, snorts) Yeah, right?*

Don and Liz openly discussed how they struggle to work together. Once when Don was absent, Liz monitored and reflected upon her negative peer beliefs for Don. She attributed the source of their conflict to differences in values. Liz said that Don doesn't care about people or patients, which was in direct violation of her identity, "somebody [Liz] who, like breathes empathy and

implicit bias."

Liz: *Does it sound like I hate him [Don]?*
Jason: *Hate is probably a strong word.*
Viola: *Yeah, I agree.*
Liz: *I'm not*
Liz: *Yeah, because I don't. I don't hate him. He sure knows what buttons to push*

As a result Liz and Don's relationship, Liz would challenge Don in the areas she was passionate. Don would also challenge Liz's beliefs in off-task talk and ignored or discounted her ideas for the group project, at times laughing at her ideas.

Interpersonal attributions following a peer norm violation. In situations in which a student expressed interpersonal attributions, the attributions would either be agreed upon or ignored by other group members. However, there was one instance that another group member regulated their fellow group member's interpersonal attributions. In this interaction, Jason and Viola had both arrived early to the group meeting before anyone else had arrived.

Jason: *Something to worry about is Don did the solution that I like the most, the [solution idea], and he didn't cite anything (laughs)*
Viola *Sweet. Should we ask him about that in the right way?*

Jason: *Yeah, I am. I'm going to*
Viola: *I guess it would just be good to know whether he didn't just because he didn't or he didn't because there's really no..*
Jason: *Yeah, no data whatsoever?*
Viola: *I mean, I feel like if there was no data, on like this in particular which there probably isn't, it would be at least good to find another [task strategy idea]*
Jason: *Yeah.*

At first, Jason implied that Don did not cite anything due to an internal (i.e., Don) cause. Then Viola suggested they use a strategy to assess whether the cause was due to an internal (i.e., Don) or external (i.e., the literature) cause.

As a result of interpersonal attributions and peer beliefs, the students in the low self-rated

group once managed peer conflict by assigning a retribution. After Don did not attend the last meeting due to social reasons, his group attributed his behavior to in-control and stable (i.e., his pattern of behavior) causes (previously described). Then, later while they were working on the project, one member was adamant about assigning Don a retribution.

Liz: *..and this could be for the executive summary.*
Viola: *Which Don, Don will be writing.*
Jason: *Yeah*
Liz: *(laugh) I do not, as much as I want him to write it, I'm not, I don't know. I don't' feel comfortable. Not that I want to write it, he would be great at writing it, if he would actually write it.*
Viola: *He needs to write it. Like I'm sorry.*

Since Don was absent, Viola wanted to assign him extra outside work. The reason Viola wanted to assign him extra work could have been due to fairness. Also, Viola may have wanted Don to ameliorate the peer costs to the group.

Liz's response to Viola was due to a lack of trust in Don. I believe that once Liz and Jason attributed Don's violations of peer norms to a stable cause (i.e., pattern of behavior), they began to distrust him. During the last meeting Liz and Jason agreed that they did not trust Don.

Liz: *I have a really scary thought that he is not going to do the last submission*
Viola: *I don't trust… Yeah, I don't, I don't*
Liz: *And I honestly don't trust him too.*
Jason: *Well, after he [Don] left me up and dry to go to the fucking movies*

Jason was telling his group that he doesn't trust Don after he relied on Jason while he went to a movie (as previously described). Then Don not attending the final meeting probably intensified Jason's beliefs about Don. Therefore, students can lose trust in their peers after attributing the peer's behavior to a negative stable cause.

Negative beliefs about the group. Although the high self-rated group had no instances of expressing negative beliefs about the group, the low self-rated group members did, at times,

express negative beliefs. At times, the negative group beliefs would go unregulated. For example, Viola once told her group, “we’re smart, but we’re not that smart” without any group members conflicting with her comment. There were two instances in which other group members attempted to control another group member’s negative group beliefs.

Jason: *We enjoy our unproductive conversations quite a bit (laughs to himself)*
Liz: *It’s just hard to be productive in general. It’s not like these unproductive discussions are the reasons we’re not gonna pass this class*

In this example, Liz was attempting to control Jason’s negative belief about the group by agreeing with the comment, but normalizing and justifying the group behavior, thereby alleviating the negative connotation. In another example, Liz expresses a negative group belief, but then controls for her own comment.

Liz: *I think we got ahead of ourselves. As usual.*
Viola: *Hmm?*
Liz: *Sometimes, I just ... I always have a hard time slowing down and just thinking about all the different ways to impact a problem.*

At first, Liz said that the group got ahead of themselves, but then shifted the comment to only pertain to herself. Due to this shift, the group moved on from her comment.

Differences in social goal orientations. In this high self-rated group, the students reflected on their differences in social goal orientations. Near the end of the project, Rick was absent. The other group members were discussing their progress when Brett mentioned that Rick had been completing outside work. After Brett mentioned this, the group discussed the reasons for why he was putting forth more effort.

Amy: *I mean I think he [Rick] wants to like put this in his portfolio, to show [professor]*
Brett: *..but, I think that...*
Amy: *It's [the power point] going to be good if he's going to show*

[professor]
Mary: *Yeah*
Amy: *We're good. We're fine.*
Brett: *Rick told me that he wants ... For him this is pass/fail obviously, because he cares more about the reputation.*
Amy: *It's all about the reputation.*
Mary: *What, his reputation in the group?*
Brett: *With [professor], with [other professor].*
Mary: *Ah, I see.*

Directly after this exchange, the group members proceeded to smile and laugh about Rick's need for social approval to indicate that they did not share in his belief. Therefore, one of this group's motivation challenges was a difference in their social goal orientations. However, they only ever reflected on the challenge and did not control for it. The group never controlled for the motivation challenge since it was beneficial for the group members. The other group members allowed Rick to put forth effort that benefited their goal of attaining a high pass. For instance, Amy said in the example that their presentation was going to be good due to the motivation challenge.

Overall, the regulation of motivational social beliefs, values and goals were rare events as the types of motivational challenges and regulation would only emerge in one group and not the other. However, they were crucial to understanding the motivation dynamics of the groups. For example, the low self rated group ended their project frustrated at Don due to their interpersonal attributions and peer costs.

Exploring differences between the two groups' negotiation and regulation of motivational social beliefs, values, and goals. In this subsection, I address **RQ3 part C**: *what differences existed in motivational social beliefs, values, goals, and regulation between the two groups?* Compared to the regulation of social beliefs, values, and goals, the expression of them was more frequent. Therefore, I summarized how the two groups differed in their regulation

using previously described examples. Then, focus the majority of the section on how the groups negotiated their beliefs or values about the self, peers, and the group. I noted whether each interaction resulted in a co-construction outcome of a shared agreement, established agreement, or a lack of group agreement. I also compared the two groups between their social goal orientations.

Differences in regulation. Both groups were challenged with negative peer beliefs. However, neither group controlled their negative peer beliefs. The high self-rated group monitored their beliefs privately, whereas the low self-rated group monitored their beliefs openly. The low self-rated group faced and controlled for two motivation challenges that the high self-rated group did not experience: interpersonal attributions following a violation of a peer norm and negative group beliefs. The high self-rated group, on the other hand, reflected upon their differences in social goal orientation. They realized that Rick held a strong social approval goal, whereas the other members did not.

Differences in negotiation. Table 21 provides every identity statement students made throughout the ten working sessions. Some students, Amy, Brett, and Viola rarely made identity statements, whereas others, Liz and Linda, made several. Students more freely expressed negative identity statements (e.g., "I'm a little slow) to balance out a positive behavior (e.g., completing something on time), gain other students' favor, or make conversation.

Identity statements were more useful to understanding within-group differences than between-group differences. Since students came into collaborative learning with established identity beliefs, factors such as gender played a larger role. The female students were harder on themselves about school-linked identities. For example, Liz called herself stupid, slow, and bad at math and English. Mary said she was scatter brained and Linda said she was not good at

thinking of solutions. However, Linda would advocate that she was a good writer, creative, and a good PowerPoint maker while also believing she was bad with technology and public speaking.

Table 21

Differences in Self Identity Statements

Student	Identity Statements
	Low self-rated group
Don	I flip flop on almost everything I believe, I'm sick of school, my attention span is 20 minutes, I'm laissez-faire
Jason	I'm not empathetic, I'm an anarchist, I'm an underserved individual this year, I'm very pragmatic
Liz	I'm caring, empathetic, I care about patients, I'm bad at English, I'm bad at math, I talk a lot to feel heard, I'm not really liked, I'm not innovative, my ideas are a little out there, I'm a little slow, I'm so stupid, I'm money hungry, I've lost my mind, I've a hard time slowing down, I'm a hater
Viola	I'm not dumb
	High self-rated group
Amy	N/a – no instances
Brett	N/a – no instances
Linda	I'm the stage manager, my role is getting the group back on-task, I'm talented, I'm good at PowerPoint, I'm an introvert, I'm not good with technology, I don't have an interesting life, I'm difficult, I'm not good at finding a solution, I'm an old lady, I'm a pessimist, I'm not good at public speaking
Mary	I'm scatter brained I guess
Rick	My role on the team is to repackage things, I try to have substance, I'm an extrovert, I'm an advocate, I'm so lazy, I need to exert a certain energy every day, I'm pretty young

Compared to other constructs, students rarely co-constructed *shared* beliefs about themselves. Students' self-proclaimed identities were often agreed upon, disagreed upon, or ignored by other group members. For example, Liz said she was bad at math and followed up with another statement.

Liz*:* *I can't even do calculus, so yeah.*
Don*:* *Really? Yeah you can.*
Jason: *You had to do calculus to get here.*
Liz: *No, I didn't.*

Similar to other instances, Liz maintained a durable belief that she was bad at math, even when this belief was met with disagreement.

Differences in negotiating beliefs or values about peers. Compared with self-proclaimed identity statements, the students would co-construct peer beliefs. For example, the high self-rated group built several shared agreements around Rick's identity as depicted in Table 22. Except for building his identity as a technology guy, his group would discuss the type of person he is whenever he was absent. They came to a shared understanding that Rick was entertaining because he was unique, enjoyed being busy, and was someone who cared about his reputation.

There were large differences in the extent to which students co-constructed others' identity. As shown in Table 22, Liz frequently expressed her beliefs about her peers, whereas Viola and Don had no instances of expressing their beliefs about peer identity.

Table 22

Differences in Peer Identity Statements

Who the Statements Were About	Peer Identity Statements
	Low Self-Rated Group
Don	Lack of group agreement [Initiator] Doesn't care about people [Liz], ignorant [Liz], a white boy [Liz]
Jason	Shared agreement [Initiator] Is nice [Liz], has a soul [Liz], is good at English [Liz], is a child [Liz, jokingly]
	Established agreement Is totally chill (Liz)
Liz	Established agreement [Initiator] Is a people person [Jason]
Viola	Established agreement [Initiator] Has a laissez-faire leadership style [Liz]
	Lack of group agreement [Initiator] Is fantastic [Liz], smart [Liz], likable [Liz]
	High Self-Rated Group
Amy	N/a – No statements made about Amy
Brett	Lack of group agreement [Initiator] Is silly [Linda]
Linda	Shared agreement Is a good writer
	Established agreement [Initiator] Is smart [Rick], is one of "our stars" [Amy]
Mary	Established agreement [Initiator] Is difficult [Rick], limits our ability to think creatively [Rick]
Rick	Shared agreement Is entertaining, loves a busy schedule, a technology guy, talks too much, wants social approval from professors
	Established agreement [Initiator] Is the front man in the group [Linda], one of "our stars" [Amy]
	Lack of group agreement [Initiator] His thinking is valuable [Linda], optimistic [Linda]

Differences in negotiating beliefs and values about the group. The two groups had notable differences in their group and teamwork beliefs, which led to differences in how the two groups used individual versus group activities. In the low self-rated group, Viola mentioned that teamwork was hard. Also, Don espoused early in the group project that most of the work could be done from home. As far as their group behavior, the low self-rated group would discuss the problem and solutions together, but then split up the assignment work into equal individual parts. The decisions to split the work into individual pieces was conducted without much negotiation as if it was routinized process for these students.

In the high self-rated group, Mary said during the first group meeting that, "we like each other and feel comfortable." All of the group members appeared to enjoy socializing and affiliating with the group. Compared to the low self-rated group, the high self-rated group used more group review and synthesis activities. Notably, that group would brainstorm individually and then review, synthesize, and build off of the individual work as a group. Then the group would have Linda organize and execute their ideas into the group papers. The high self-rated group appeared more thoughtful in their decisions of when to conduct an activity as a group versus individuals. On three occasions, the high self-rated group's problem solving had plateaued. In response, this group used the task strategy of individual brainstorming followed by group review.

Linda started this group behavior by bringing in large post-it notes and markers during meeting one. Then Rick and Brett both suggested to use these materials to individually brainstorm after the group conversation had stalled. Brett said, "so why don't we each take one and then we can, so we need to list the problem statement to be solved, and the objectives/aims of our project – so, what we think." During the group review of the post-it note work, they took

turns giving each other positive feedback on each other's ideas. Near the end, the group did not reflect on the success of their approach, but their facilitator did communicate non-verbally to the group that he was impressed by their approach to use the post-it notes. In later meetings, they brought the post-it notes back when it was time to brainstorm their solution. They also used their computers to individually write and brainstorm during another meeting. Overall, this group negotiated specific group utility beliefs. In this case, they built a shared understanding that individual thinking was useful for initial brainstorming and a group was useful for reviewing and building from individual thought.

Both groups also co-constructed shared group identity beliefs as depicted in Table 23. For the low self-rated group, the group identity beliefs shifted throughout time. At the beginning of the group project, Liz called the low self-rated group "overachievers" and the facilitator told the group they were "great and proactive." Near the middle of the project, the group reviewed their individual test grades for another course. Viola concluded that they were all below average academically. Near the end of the project, the group compared themselves to other groups. They believed that when the facilitators were traveling around to different group, they intentionally avoided their group.

Liz: *I feel like we're children waiting to get adopted, and they're [professors] walking around-*
Jason: *Yeah. Yeah.*
Liz: *-like-*
Jason: *We're, we're*
Liz: *"Nope. I don't want them."*
Jason: *-we're like the children version of an animal shelter*
Liz: *That's really sad*

I categorized the group identity of "the children version of an animal shelter" as a negative group identity. The group also expressed a negative group identity when Viola said, "we're smart but we're not that smart." Therefore, the low self-rated group started with a positive identity, but

ended with a negative identity.

Table 23

Differences in Group Identity Statements

Low Self-Rated Group	High Self-Rated Group
Shared Agreement We are the "children version of an animal shelter"	Shared Agreement We're "young at heart," "exceptionally very good group", "highly functional", "really cute", "we like each other", "supportive" Our group has two people with a strong background
Established Agreement [Initiator] You're "great" and "proactive," [Facilitator]	Established Agreement [Initiator] "We talk a little crap," [Brett] We're "usually the hardest working group," [Linda] "We're better than other teams, we're lucky", [Rick] "Our dynamics are evolving", we're "unnecessarily stacked," we have "too much talent," [Rick and Linda]
Lack of Group Agreement [Initiator] "We enjoy our unproductive discussions quite a bit", [Jason] "We're smart but not that smart", "We're all below average academically", [Viola] We're "overachievers," "we got ahead of ourselves as usual", [Liz]	Lack of Group Agreement [Initiator] You're "fast", "ahead of the curve", "very advanced", [Facilitator] "My people," [Mary] We have a high "level of ability," [Linda and Mary]

In comparison to the low self-rated group, the high self-rated group created shared agreement for positive group identities and maintained a positive identity throughout the project. In the beginning of the group project, they agreed that they liked each other and believed they had high ability. By the end of the project, the group gushed about how they were an "exceptionally very good group" who had "really cute" text messages to each other. Although Rick and Linda were frustrated with Mary and the other group member's "just get it done" motive, Rick and Linda thought the group, overall, was better than other teams and "unnecessarily stacked" with "too much talent."

Outside of observing the group work, the end of course focus groups also revealed insights into group beliefs. Students expressed that what they deemed to be a "good team" drove their group ratings on Collabucate. For example, Rick said he thought about "whether the group is being productive, time management, motivation, commitment, who's doing the work, and who's talking too much." He said that after group meetings he reflected on whether the two-hour group meeting was worth the time. The low self-rated group also expressed that productivity and efficiency were their main driver in rating the quality of their group work.

Differences in negotiating social goal orientations. In the high self-rated group, their facilitator pointed out their final proposed solution would not have a viable financial model. They all teamed up against him to advocate that their goal was to improve health care and save lives, not make money. In this manner, the group co-constructed a shared agreement that one reason they were engaging in the task was to contribute to society (i.e., social welfare goal). As shown in Table 24, the high self-rated group also created a shared agreement that one of Rick's motives was social approval. When Linda and Mary voiced their outside struggles during a meeting, the entire group elaborated on their social concern for them. Also, the group created a desire to affiliate with each other. During the first meeting, Linda brought in supplies for a group bonding activity. In another example, they discussed their frustration with a course activity because it forced Brett to be alone.

Brett: I just don't want it-
Mary: It also kind of the breaks group.
Brett: Yeah.
Linda: Like you are a part of the group.

In the high self-rated group, the students not only cared about the course director and facilitator's social approval, but the social approval of each other. For example, during one day that Rick was absent, Brett says, "Rick would love that" in response to a group decision. For individuals within

the group, Linda and especially Brett displayed their concern for other group member's wellbeing and emotions. Rick voiced his concern for other students' learning on multiple occasions. He believed the course was valuable and was frustrated that his cohort was going through the motions. Rick also expressed his social responsibility beliefs that the group's workload should be equally divided. He stated these beliefs to Linda in an attempt to regulate her inclination to complete an oversized proportion of the work.

Table 24

Differences in Social Goal Orientation Statements

Low Self-Rated Group	High Self-Rated Group
Shared Agreement Don violated social responsibility	Shared Agreement Social welfare Rick has a social approval orientation Social concern for Linda and Mary Social affiliation
Established Agreement [Initiator] Facilitator approval, [Jason] Social responsibility – turn taking, [Jason] Social responsibility – attention, [Viola] Social responsibility – fairness, [Liz and Don]	Established Agreement [Initiator] Rick's social approval, [Brett] Facilitator's social approval, [Mary, Brett, Linda]
Lack of Group Agreement [Initiator] Social welfare, [Liz] Social concern –other's wellbeing and feelings, [Liz]	Lack of Group Agreement [Initiator] Course director social approval, [Mary] Social concern – other's wellbeing and emotions, Brett and Linda] Social concern – other's learning, [Rick] Mary's social approval, [Rick] Social responsibility – fairness, [Rick]

In comparison to the high self-rated group, the low self-rated group built fewer shared agreements around social orientations. The one orientation type they did build was when Don was absent during the final meeting and the remaining students believed this violated social responsibility. Don skipping the meeting also suggested that he did not hold a strong orientation

for social responsibility. Don previously voiced a belief that the workload should be equally shared, therefore his belief either did not translate into a strong orientation or he did not believe this to apply to in-person group meetings. Jason, Viola, and Liz all apologized at certain time points for violating norms such as talking too much, not paying attention, and not completing work. Their apologies indicated that they are driven, to some extent, by a social responsibility orientation. For other orientation types, the group would agree with Jason that they wanted social approval from their facilitator. This would drive their behavior to persist in the task until the facilitator arrived. As far as individuals within the group, Liz displayed a strong orientation towards social concern for other group member's wellbeing and feelings. She would ask them how they were doing, comfort them if she thought they needed it, and ask them about their daily lives. Her strong social concern orientation originated from her identity as an empathetic person, which will be reviewed in the next section.

Summary of group differences. Overall, both groups contained a diverse set of personal identities. They both had individuals co-construct peer's identities, although Liz did so much more frequently. The most salient differences between the two groups were their group beliefs and social goal orientations. The low self-rated group ended the project with a negative group identity and never established shared social goals. The high self-rated group created a positive group identity throughout the project. They also shared a social welfare goal for their group project and a social affiliation goal for working with each other.

Emergent theme: Students managed their impression of whether they care or put forth effort. Depending on the audience, the students managed their impression of whether they cared or were putting forth effort. This phenomenon afforded and constrained the types of motivational beliefs, values, goals, states, and behaviors that the students expressed. For

example, when the professor was in the room, the students would suggest that they cared about the task. However, they often said, “I don’t care” when only the group was present. This form of impression management was even noted by the students. In the low self-rated group, one student used the following explanation for why he was putting forth effort: “It will make us look really good when [the facilitator] comes. That’s all I’m trying to do here (laughs).”

How students managed their impression can be organized according to Sinclair’s (1997) extension of Goffman’s (1959) theory of Impression Management. During coding and synthesis, these theories emerged as explanatory tools to understand salient differences between students’ conversations. Goffman (1959) used the metaphor of theatre and acting to explain how people manage their social environment. As shown in Figure 7, in impression management, there is an off-stage, front stage, and a back stage. The off-stage is free from an audience so the person may be themselves and it is unnecessary to manage their impression. The front stage is where social roles are played and other people will role-play with the actors. For example, the students played the role of caring students. In this study, the front stage was whenever the professor (facilitator) was in the room with the students. The back stage, which, in this study, was when the students were alone, is the medium through which front stage impressions are contradicted or constructed. The students are not off-stage because their peers are in the room, but there is not an authority figure, thus it was the not front stage. The front and back stage can be further separated by whether an activity was “official” or “unofficial” (Sinclair, 1997). In this study, I deemed on-task work as official work and off-task talk as unofficial. I followed Sinclair’s distinction between official and unofficial work since the students appeared to play different roles in their off-task talk compared with their on-task talk.

	Official	Un-Official
Front Stage	Facilitator in the room – On Task [Appear effortful and willing] Representative quotes: "*Well, I mean we have a thousand questions*" – Rick	Facilitator in the room – Off-task [Appear professional] Representative quotes: Students – "*I did bad on the test"* *"The test was hard*
Back Stage	Group work – On task ["Just get it done" and appear smart] Representative quotes: *"It will make us look really good when [professor] comes in. That's all I'm trying to do"* – Jason "*It's only a pass/fail course*" – Rick "*Okay so, what three solutions do we wanna pick, let's just get this done."* – Brett	Group work – Off task ["Don't care" and appear effortless] Representative quotes: "*What are the odds I skip lab?"* – Don "*I'm trying to leave early*" – Amy "*I don't care*" – Brett "*It's only 1% of our grade*" – Don
Off Stage	Conversations with a comfortable audience [No impression management Psychological safety]	

Figure 7. Subthemes according to settings in Impression Management theory

Offstage – Psychological safety. In the high self-rated group, the group decided not to meet one day in the middle of the project, but two of the students, Rick and Linda, still met. I called Rick and Linda's interaction that day "off-stage-like" because it was vulnerable and comfortable but they knew of the cameras, so it was not entirely off-stage. At the beginning of their interaction, they built relatedness between each other; sharing their struggles with school work and fitting in with their cohort. Then they turned their discussion to their group problems and asked each other for feedback.

Asking for feedback, discussing problems, and admitting errors are characteristics of psychological safety (Edmondson, 1999). Psychological safety is an interpersonal belief of when

individuals believe appearing incompetent will not cost them their image (Edmondson, 1999). In teams, mutual respect and trust creates a shared belief the group members will not embarrass, reject, or punish another for speaking up. As Rick revealed to Linda that he did not speak up about Mary's behavior because he feared costs to his image, I believe the group did not have psychological safety when Mary and Rick were together. Therefore, Rick and the other students managed their impression. In fact, Rick shared with Linda how he sized up the "audience" in his impression management.

> *Rick: I mean from day one, as soon as I mentioned we might have to work a Sunday, Mary was like...*
> *Linda: Oh hell no!*
> *Rick: I mean I knew right then that this was the audience.*

The interaction between Rick and Linda was the only interaction I observed in which the students took interpersonal risks. In other interactions, the students managed their impression according to audience and activity.

Front stage – Students appear effortful, willing, and professional. During each two hour session, a professor (facilitator) would stop by the group meetings for a half an hour. The students would use different types of motivation talk when the professor was present. In this way, the students appeared to look effortful, willing, and professional. Certain group members would engage more when the facilitator was present. The students would ask questions, sometimes just to ask a question. In a few cases, the students would rehash a conversation they already had with each other with the facilitator, but it would be framed to make the students appear more professional. For example, the students were complaining about a test they just took and were blaming the professor of that course for not teaching them and having poor test questions. Then when the facilitator was present, they simply said the test was hard and did not mention how they felt slighted.

Back stage, official work – Students attempt to appear to just want to get it done and appear smart. Across both groups, the students appeared to impress other students if they just wanted to get the assignment done quickly. For example, when the group was present, Rick quickly backed down from his group requests and said "I don't care, it's only a pass / fail course" even though he previously told Linda that he did care about the task. The low self-rated group appeared to use this peer norm of only putting forth effort for grades to protect their self-worth. At the end of the project, the low self-rated group received poor feedback but an average grade. At first, the students were hurt by the poor feedback, but then Jason said, "they still gave us an 85, so … whatever.. there." In this manner, Jason reinforces for his group that as long as the results are sufficient, the students should not care about the rest.

The students were impressed with each other when someone could complete a significant amount of work in a short time. The students implied that "smart" people were capable of this. In one interaction, the students took 10 minutes to individually brainstorm text for their paper. After the 10 minutes, they compared the length of what they wrote. Mary wrote three paragraphs.

Amy: *I have like three lines -*
Brett: *- And she's [Mary] been done for like 10 minutes -*
Mary: *I've been answering my Instagram but why -*
Brett: *- This is how you get everything done, isn't it? You're so quick.*
Mary: *I'm just - I'm very focused in chunks of time. Um, what - that's yours, look how long yours is.*
Brett: *But like three sentences of it were already there. [laughter]*

In this interaction, Mary appears to downplay the other students' reactions and say she was focused. However, she also mentions that she was off-task on Instagram® to greater highlight her efficiency. Later, after Mary leaves the room, one of the students' claimed that he saw Mary use text from a Word Document. Therefore, it is possible that Mary spent time outside of class to work on the assignment and used that situation to cover up her extra effort or to appear smart to

her classmates. Either way, students are not only using framing to manage their impression, but will also make little white lies.

Back stage, un-official work – Students appear effortless and uncaring. Compared to when students are on-task, when students are off task, the impression management to look uncaring and effortless intensifies. Often this occurs when students are talking about other school activities or courses. The students will boast about skipping classes and frequently say they don't care or are not worried. In the following example, a student gets caught by his peers for his boast about skipping class.

> *Don: What are the odds I skip lab tomorrow?*
> *Liz: Lab?*
> *Jason: What about quiz? He's going to-*
> *Don: Yeah, but it's worth like, 1% of our grade, per quiz ...*
> *Liz: You'd skip lab, that's ballsy.*
> *Don: No. I am gonna go.*
> *Jason: You're gonna go?*
> *Don: I'm gonna go.*

The students would also freely boast about poor performance such as test scores or GPA. It appeared to be a boast because they usually laughed afterwards and said it sternly. Through this expression, the students communicated that they did not care. There were no instances of the students talking about their individual high performance. I believed that this was the case, because when students did reveal evidence of extra effort, the other students would almost certainly chide them. The students would chide by saying statements such as "you decided to torture yourself," and "why are you taking extra classes?!" The students may have chided each other's extra effort to unconsciously keep each other in the majority.

Overall, impression management was a salient theme found through our observations. It afforded and constrained regulation and the types of motivational beliefs students expressed. For example, students in this study may have held high value or interest for the task, but did not feel

safe to express those in their groups. I outlined the impression management by the students not to highlight a limitation of the study, but to reveal an important group mechanism. If a student believes another students does not care about the task, it is highly probable that their own motivation will change for the task.

Motivational States and Behavioral Expressions

In previous sections, I have already addressed how students regulated their task and social beliefs, values, and goals. I address **RQ4**: *How did motivational states and behavioral expressions occur in two extreme cases of collaborative learning groups.* In the first sub-section, I characterize how motivational states and behavioral expressions emerged in both groups. In the second sub-section, I characterize what types of challenges and stimulus events invited both groups to participate in what types of regulation of motivational states and behavioral expressions. Compared to previous sections, the central focus is on how students regulated their motivational states and behavioral expressions. By and large, students' regulation of motivational states and behavioral expressions was the dominant form of motivation regulation. In the last sub-section, I compare between how the two groups differed in their negotiation and regulation of motivational states and behavioral expressions.

Characterizing motivational states and behavioral expressions. In this sub-section, I address RQ4 part A: *how did motivational states and behavioral expressions emerge?* I define motivational states as the energetic drive, moment by moment, willingness that a person feels when they describe themselves as "feeling motivated." Through Collabucate ratings, I captured snapshots of the individual students' motivational state (i.e., "my will") as well as what they perceived to be the group's motivational state (i.e., "our will").

The students submitted Collabucate responses at six timepoints throughout the group

project. The students would individually submit their Collabucate responses in between group meetings. For example, they might meet on a Tuesday and submit Collabucate responses on Wednesday. In Figure 8, I have graphed the low self-rated group's individual ratings of "my will" on a scale of 0-100. The students were responding to the question "rate your will on a scale from 0 to 100." In summary, the members of the low self-rated group varied in their ratings of their own will. At the most extreme timepoint, Don rated his motivation level a 55 while Jason rated his a 90. Also, both Don and Viola rated their personal motivation level the lowest during the middle of the project.

Figure 9 depicts students' responses for how they rated their group's "will." The group's ratings of the group's motivation level consisted of less variability between the group members. Although each group member's ratings were different, most of the group members followed the same pattern of rating the group's motivation high at the first timepoint, then it suffers a dip, rebounds, but eventually ends at it's lowest point. Viola, in particular, rated her group's motivation low at the end of the group project.

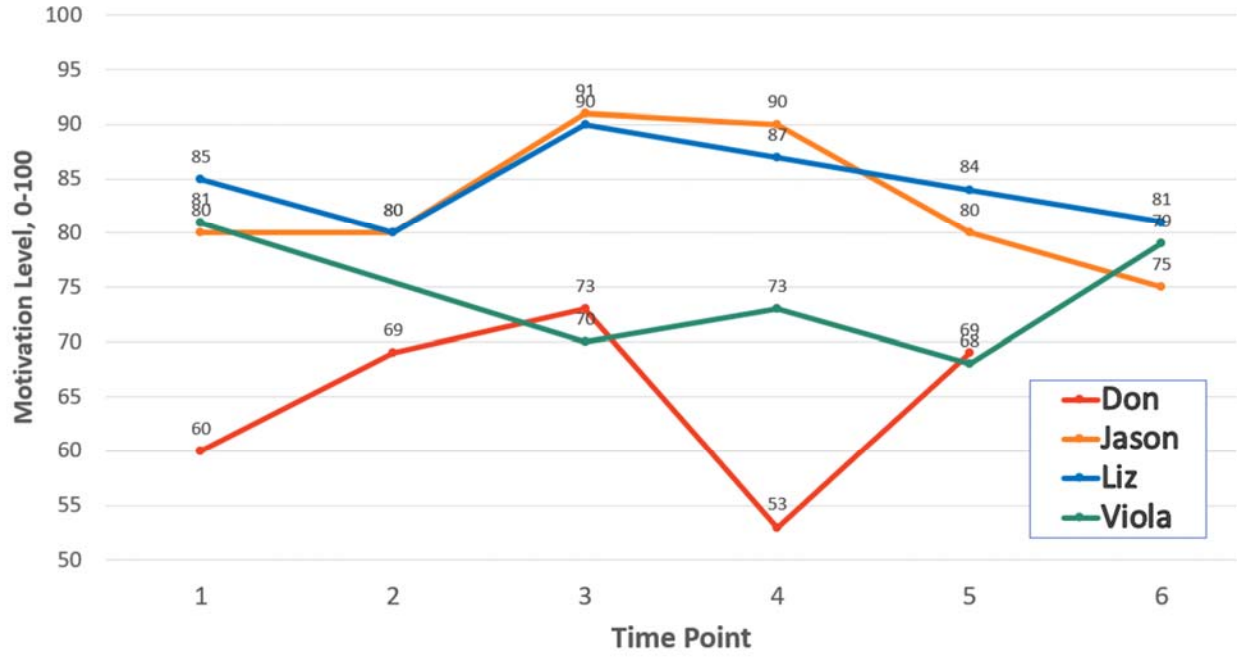

Figure 8: Ratings of "my will" for each member of the low self-rated group over the semester.

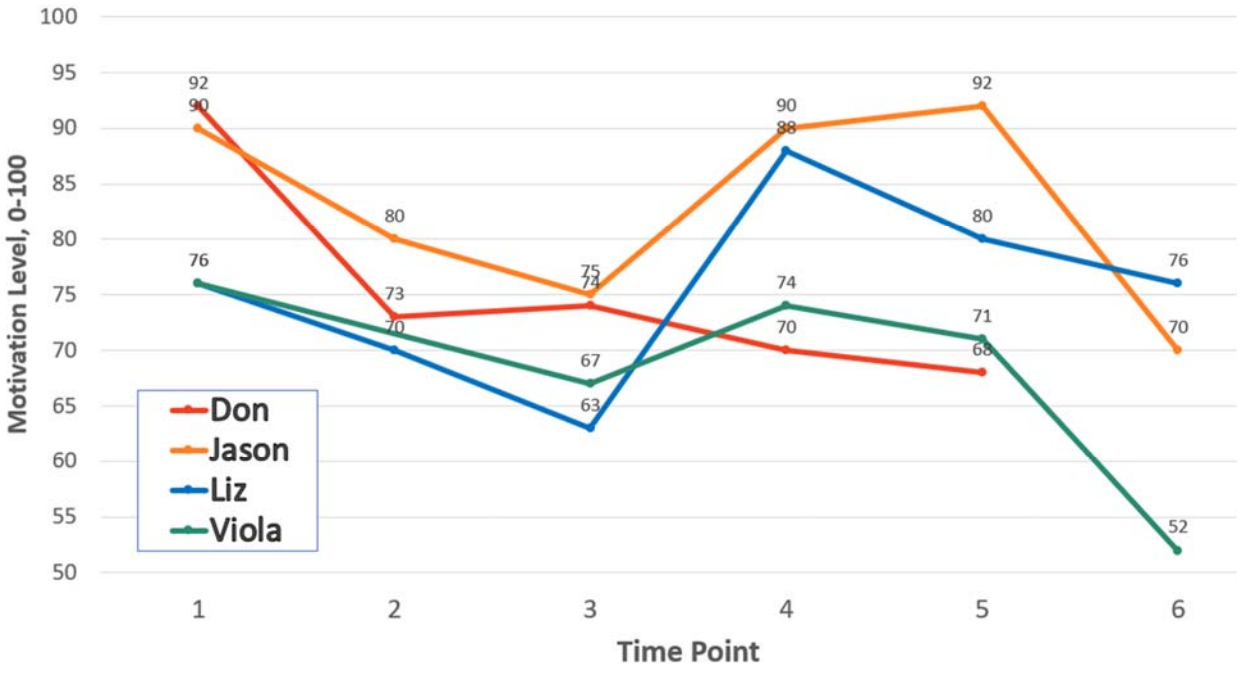

Figure 9: Ratings of "our will" for each member of the low self-rated group over the semester.

Similar to the low self-rated group, the high self-rated group's members had variability in their group member's rating of personal motivation. At the extreme case, Mary rated her personal motivation level a 60 while Brett and Amy rated their motivation levels a 100. However, as shown in Figure 10, Mary's motivation level eventually recovered and the entire group ended the project with high personal motivation ratings. In contrast to the low self-rated group, the high self-rated group was consistent in their group motivation ratings (see Figure 11). Throughout the project, individual members varied their ratings, but overall, the group maintained a high perceived motivation level.

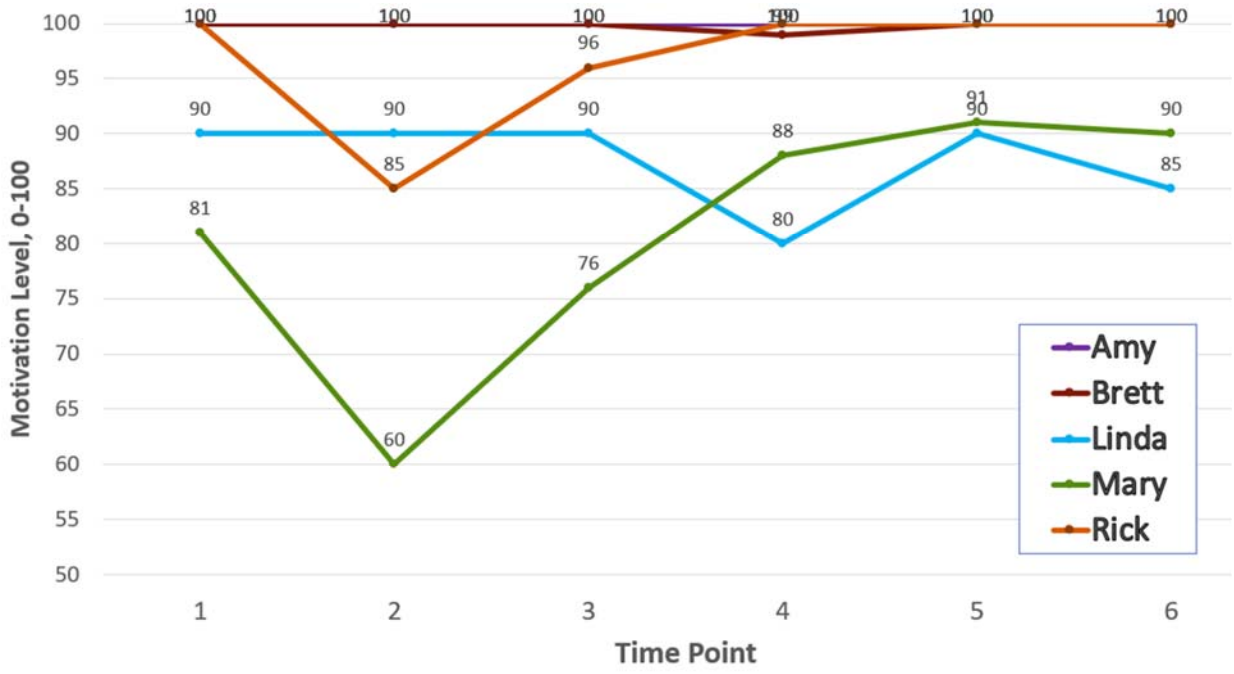

Figure 10: Ratings of "my will" for each member of the high self-rated group over the semester.

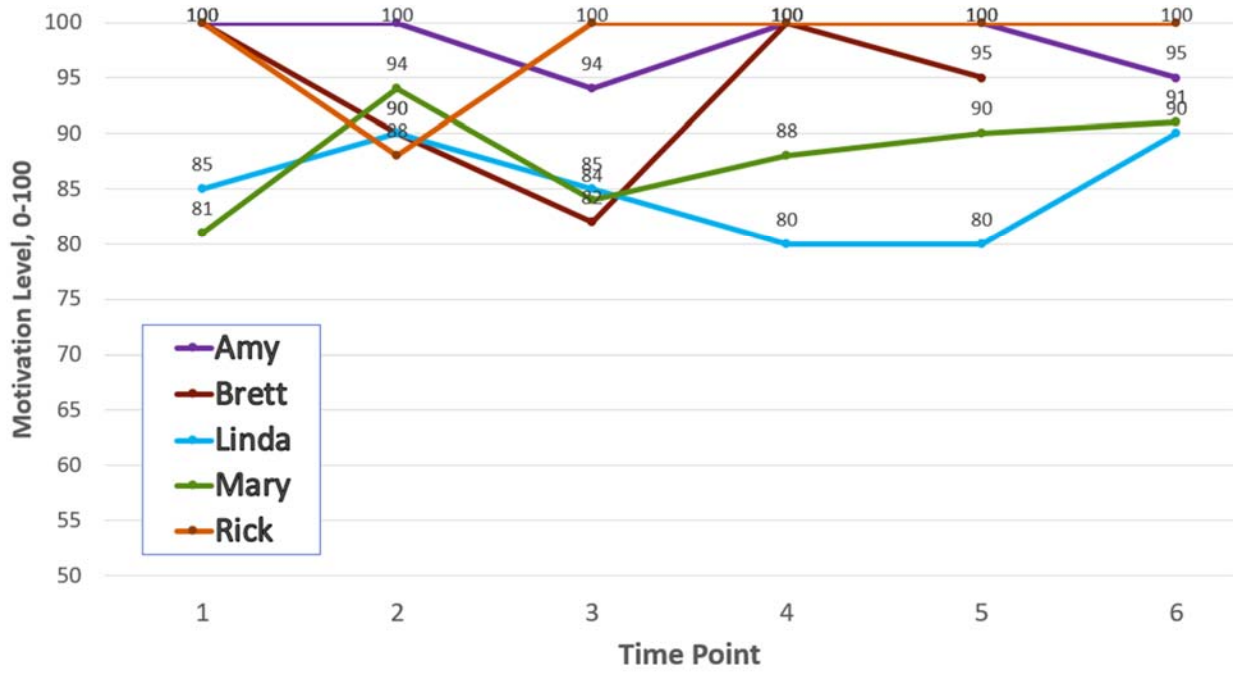

Figure 11: Ratings of "our will" for each member of the high self-rated group over the semester.

I defined behavioral expressions as the observable manifestations of motivation types or states. For example, previous researchers have studied students' choices, attention, participation and persistence (Engle & Conant, 2002; Sinatra et al., 2015). In this study, I did not proactively code for student choices, attention, participation, and persistence. Doing so was out of the scope of this study. However, the regulation of these behavioral expressions were captured and described in the next sub-section.

Although on- versus off-task talk was not a full representation of all the different types of behavioral expressions, I did code the entire data set for "off-task talk." Off-task talk included conversations that did not pertain to the group task. In off-task talk, the students would often discuss other courses, their peers, popular media, or current events. As shown in Table 25, both groups participated in a substantial amount of off-task talk. In these students' group meetings, off-task talk consisted of anywhere from 9% to 61% of the talk turns, which meant that on-task

talk ranged from 91% to 39% of the students' talk turns.

Table 25

Off-task talk and Meeting Length According to Group and Session Number

		Group Session Number									
Group	Behavior	1	2	3	4	5	6	7	8	9	10
High self-rated group	% off-task talk turns	21%	14%	29%	46%	32%	25%	35%	22%	23%	20%
	Length of meeting (minutes)	96	97	81	93	52	60	80	66	38	80
Low self-rated group	% off-task talk turns	9%	26%	39%	28%	25%	60%	61%	44%	59%	40%
	Length of meeting (minutes)	74	100	74	109	81	75	75	35	45	95

In addition to capturing on-task versus off-task talk, I recorded how long the students persisted in their group meetings. As shown in Table 25, group meetings ranged from 35 to 109 minutes. In the context of the study, the students were allotted 120 minutes of protected time to complete their group project. Nonetheless, the students often elect to leave early during each group meeting. I noted the students' reasons for leaving early when I coded for their regulation of motivational states and behavioral expressions.

Characterizing the regulation of motivational states and behavioral expressions. In this subsection, I address **RQ4 part B**: *what types of challenges and stimulus events invited what types of regulation statements and strategies for the regulation of motivational states and behavioral expressions?* Wolters and Benzon (2013) include the regulation of engagement and willingness (i.e., motivational state) in their definition of motivation regulation, but do not

distinguish the regulation of motivational task beliefs, values, and goals from the regulation of willingness and engagement in their work. I have now separated motivation regulation into the following three domains: the regulation of 1) motivation task beliefs, values, and goals, 2) motivational social beliefs, values, and goals, and 3) motivational states and behavioral expressions.

The students regulated their own, others, and the group's motivational states and behavioral expressions. For individual motivation regulation, students would monitor either their internal state, inattention, or external factor and then notify the group how they would manage the challenge. For example, a student may say, "I'm getting too many text messages, I'm going to turn off my phone." In chapter two, I formulated the following five types of motivation regulation facets from individual motivation regulation research (Boekaerts, 1996; Wolters & Benzon, 2013) and theory (Hadwin et al., 2018): 1) create a motivation intention, 2) construct meta-motivational knowledge, 3) monitoring motivation state, beliefs, or knowledge, 4) intentionally enacts a strategy to overcome a motivation challenge (i.e., control), 5) reflect on motivation state, beliefs, or knowledge. Within the motivational states and behavioral expressions domain, the students engaged in each facet. For example, one student created a motivation intention for the group "to be productive." Linda and Rick co-constructed meta-motivational knowledge about how to motivate other group members. The students would frequently monitor their motivational state or behavioral expressions. They used several types of strategies to manage their effort allocation, attention, productivity, and more. Lastly, they reflected on their focus, progress, and effort allocation between group members.

I paired each regulation strategy with the challenge or stimulus event type the students were regulating. As shown in Table 26, certain types of stimulus events invited students to

regulate their motivational states or behavioral expressions. The stimulus events included task demands, poor feedback, good feedback, environmental or task structure, external factors, and internal needs. External factors were outside of the group work learning environment including life events and outside coursework. For example, one group meeting took place after a difficult test (i.e., external factor) that afforded low engagement and caused both groups to leave early. Internal needs were individual's emotions, physical needs, or social needs.

The task itself invited motivation regulation. Due to the task, the group allocated their energy between and towards activities. Also, they allocated efforts between each other. In Table 26, strategies are listed under the regulation phase planning for how groups allocated effort towards activities and between each other. To approach the task, the group had to set expectations, standards, goals, and determine rewards, which activities to put forth effort towards, and how effort each activity would afford.

Then the group had to determine which activities to split up and which to complete as individuals. They also decided which members were completing which parts. The group process varied between asking for volunteers, accepting a volunteer, using the best person for the job, and having an individual complete a task without the group's awareness. Also, all the students in the study shared a belief that effort allocation should be "fair" and "equal." For example, Rick told Linda that it was not "fair" for her to complete more work than other group members.

In addition to task demands, the groups managed their effort following good and bad feedback. The groups also used strategies to manage their environment. For example, the high self-rated group decided to meet earlier in the day during one meeting. Students were challenged in their group project to manage external factors. For instance, a test grade was released during the time block that the groups were meeting. The students found this so distracting that they

decided to stop their work and check their grades. Lastly, students would manage their motivational states and behavioral expressions due to internal state needs. Most frequently, students requested breaks during the group meeting to get coffee or a snack. Also, if a group had low energy, they would decide to end the group session early.

As shown in Table 27, the group also responded to challenges in their motivational states and behavioral expressions. Students would monitor their own or other's lack of attention. At times, the students would control for their attention by limiting distractions or structuring the environment. To control other's attention, students would joke about or call out another student for not paying attention. For example, one student laughed and mockingly said, "Amy's over here shopping!" Students were also challenged by other unproductive behavior including off-task talk, not completing their assignment, or not using time effectively. As a result, group members would create a motivation intention at the beginning of the meetings to "be productive" or "let's get this done and leave early." Students monitored their unproductive behavior by saying "we are off topic" or "we haven't gotten a lot done." Sometimes the monitoring was a signal to control the behavior. At other times, the students were more explicit by saying "we should get back on task."

Table 26

How Students Regulated their Motivational States and Behavioral Expressions Following Stimulus Events

Motivation Regulation Stimulus event	Regulation Facet and Sub-Facet	Regulation Strategy	Representative Student Quote(s)
Task demands	Planning - Planned effort allocation between members	Volunteered or asked for volunteers	"I volunteer" "Who wants to hammer out an introduction?
		"Fair" and "equal" method	"You two did a lot of work… so I can submit this one"
		The best person for the job put forth the effort	"We'll have Rick orchestrate us"
	Planning - Planned effort allocation	Set expectations and standards	"Let's do 10, 15 solid minutes and then call it a day"
		Set goals	"I think if we each, aim to have, like, our research done over this next week"
		Determined rewards for effort	Leaving early as a reward - "and if we do, we're free to leave as well"
		Decided which activities to put forth effort	"I can start going through our Google Doc, does someone at least want to start looking into the literature?"
		Judged effort required for certain activities	"We could knock most of this out today"
Poor feedback	Monitoring - Monitored motivational state	Monitored motivation state	"Well, that was fun [said sarcastically after looking at feedback]" "I have zero motivation now"
	Control - Managed effort	Allocated future effort to different activities	"If they want detail, we will give them detail"
Good feedback	Control – Managed effort	Decreased effort	Viola: "[The facilitator] said we're good" Jeff: "Yeah, let's divvy, maybe divvy up the workload, 'cause I'm sure we all have places to be, alcohol to drink, snacks to eat."

Motivation Regulation Stimulus event	Regulation Facet and Sub-Facet	Regulation Strategy	Representative Student Quote(s)
Environment structure	Monitoring - Monitored environment structure	Monitored environmental barriers	"I'm not all there [after three lectures]"
	Control - Environment or task structuring	Environmental and task structuring	Met earlier in the day Met virtually or via conference line Used headphones (to drown out noise)
	Reflection – Reflected on strategies	Reflected on the effectiveness of the strategy	"We were so much more productive and active now [after meeting earlier]"
External factors (e.g., other tests, events)	Planning - Planned for external factors	Accounted for external factor	"If we could like go ahead and creep up on the other stuff. Because knowing my luck, we're gonna be really pressed for time [during finals week]."
	Monitoring - Monitored for external factors	Made group aware of external factor	"My brain is wrecked from [other course's test]"
	Control - Management of external factors	Took a break to discuss or address external factors	"I mean, if we really, like, don't want to do stuff, like, we could just do other [school] work"
		Ended the meeting early to address external factor	"Sorry, I have to go [to a doctor's appointment]"
		Missed group meeting due to external factors	Students skipped the group meeting to work, go to conferences, and attend social events
		Went off-task to address external factors	"Sorry this off topic, but you know how [other course material]. Is that [other course material] going to be on the [other course] quiz?"

Motivation Regulation Stimulus event	Regulation Facet and Sub-Facet	Regulation Strategy	Representative Student Quote(s)
Internal state needs (e.g., social, physical, emotional)	Monitoring - Monitored internal states	Complained about physical needs	"I'm hungry," "I'm tired," "undercaffeinated"
		Monitored motivational state	"I don't really feel like doing anything to be honest"
	Control - Management of internal state needs	Took a break, individually or as a group, to fulfill internal states	Ate food, got coffee, checked phone, napped
		Asked permission from group to fulfill needs	"Can I go get some coffee?"
		Advocated that a group member takes a break to fulfill internal states	"You could go home and nap"
		Got back on task to fulfill internal states	"OK, back to the less aggressive topic" [went back on task to avoid the tense discussion]
		Decided to end meeting early to address internal states	"I think we're all braindead and sad [after the test], and I think this can't go on today"
		Choose an easier task activity	"I was going to stay and study, but I don't' if that's gonna happen. Maybe I should go home and
	Reflection - Reflected on internal needs	Reflected on reason or source for internal need	"My brain is wrecked from the exam"

*Collabucate prompted or initiated the regulation

Table 27

How Students Regulated their Motivational States and Behavioral Expressions Following Motivational Challenges

Motivational Challenge	Regulation Facet and Sub-Facet	Regulation Strategy	Representative Student Quotes / Examples
Inattention	Planning - Planned attention	Created an expectation for their attention	"I'm not going to be paying attention in class"
	Monitoring - Monitored attention	Joked about a group member not paying attention	"Amy is over here shopping!"
		Monitored personal focus	"I zoned out," "I was paying attention"
		Monitored technology distraction	"I can't believe I really just clicked Facebook" "You caught me looking at a cat (laughs)"
	Control - Attention management	Called out group member for inattention	"You are just typing away feverishly over there [at a time that didn't necessitate typing]"
		Structured environment for attention	"Can you share the screen with me? Is that okay?" "I don't, no. [Texts on my laptop] is too distracting for me"
		Gave into the distraction	When test grades were released during a meeting, the students decided to check their test grades.
	Reflection - Reflected on attention	Reflected on attention	"Just, I think I might have zoned out during this earlier"
		Provided reason for inattention	"I have a friend crisis because of the test"
Unproductive behavior	Planning - Planned focus and progress	Set intention	"We need to improve focus" "Be productive"
		Planned ideal environment structure	"Can we try and do more of these lunch time sessions?"
		Planned to use a strategy	"We really need like a set list of to-do things, very structured."
		Planned when to leave	"4 o'clock we're going"
		Set a goal of what to complete by when	"We need to complete this by the end of the day"
		Judged required effort	"That will take some time"

Motivational Challenge	Regulation Facet and Sub-Facet	Regulation Strategy	Representative Student Quotes / Examples
Unproductive behavior *(continued)*	Monitoring - Monitored focus and progress	Monitored on- versus off-task behavior	"We are so off-topic"
		Monitored task progress	"We have gotten a lot done" "we haven't done shit"
	Control - Management of focus	Directly stated that "we should get back on task"	"We should get back on task"
		Signaled with non-verbal communication	One student repeatedly snapped their fingers at another who was off-task
		Indirectly focused the group	Students changed the topic back to the project
	Reflection – Reflection on strategies	Reflected on what previous strategies the group used*	"We have sometimes [controlled our unproductive behavior] when we say 'okay'" "[We say] 'let's get back on task'"
	Reflection - Reflected on focus or progress	Justified and explained reasons for off-task*	"It's just hard to be productive in general" "Well, the exam grade was released that day"
		Reflected on previous focus	"I think it was productive when [facilitator] was here, but the rest of the time, it kind of turned to radio noise" "I was losing it last meeting"
		Compared to previous times	"There have been days and just ughhhh" "I think we did a little better today"
		Voiced approval for focus	"I'm so proud of you guys for doing work!"
		Apologized for lack of focus	"Sorry, I'm not very productive today"

Motivational Challenge	Regulation Facet and Sub-Facet	Regulation Strategy	Representative Student Quotes / Examples
Unequal participation – Too much effort	Planning - Planned effort allocation between members	Assigned group members to low effort activities to rebalance	"You can relax" "You've done enough"
		Reassured them that they can put forth less effort now	"You don't have to worry at all. You have played your part"
	Planning – planned a strategy	Planned to restructure meetings to limit group member's ability to complete more work*	"Since she's pretty stubborn in doing the writing, we could be like use more class time to actually do the submission, so we're like writing it together"
	Monitoring - Monitored members' current efforts	Monitored how much effort each member put forth	"I just wanted to see if anybody other than Rick [read the outside work]" "Rick has already been making slides, so.."
	Control - Effort management	Freed up that person's time in other ways	"Can we piggyback and help her in any way?"
		Joked about the effort imbalance	Said to the group member putting forth greater effort - "You're going to rectify yourself, right?? [laughs]. Okay so what can you do now?"
		Discussed fairness (one on one or as a group)	"When you dump the workload on someone, it's how much, you know, that's not fair to them" "I'm asking because I feel bad"
		Pointed out discrepancy in effort between members	"Yeah, well I think, you know, other people still need to do something"
		Accepted unfairness	"I mean if you really want to take that upon yourself"
	Reflection - Reflected on members' past efforts	Pointed out discrepancy in effort between members*	"I know I've talked about how I feel like we should be doing more" "Well, you end up doing it [writing the paper]"
		Reflected on previous strategies*	"We've given her many outs, like sincere outs"
		Decided it was not a "problem"*	"I feel like [Linda] does way more than [us], like yes, but I guess that's not a problem"

Motivational Challenge	Regulation Facet and Sub-Facet	Regulation Strategy	Representative Student Quotes / Examples
Unequal participation – Too little effort	Planning - Planned effort allocation between members	Assigned group members to high effort activities to rebalance	"Which Don, Don will be writing" "Let's tell him to do something"
		Take on high effort activities to rebalance	"If you want, I can uh, I can submit it again, because you did most of the work"
	Monitoring - Monitored members' current effort	Monitored how much effort each member put forth	"So, scroll down, I think.. I wrote my section already" "So you're done then?" "He's put in his share, in his section"
	Reflection - Reflected on members' past efforts	Compared that member's efforts to what they would have done	"I would make a presentation on day one and I would say 'Look, a lot of you guys [have experience].. let's walk through the process, you ask me questions'"
Differences in group member's expectations, standards, or goals	Monitoring - Monitored group differences	Monitored group member's standards and expectations	"What are your expectations for this project? How much work are we doing?"
	Control - Management of differences	Explained the reasons and source for their own or other member's differences	"For him this is pass/fail obviously, but he cares more about the reputation"
		Advocated for own expectation, standard, or goal	"I really want to get this done" "I'm not coming in here on Sunday afternoons"
		Joked at their own or other group member's difference	"I thought you wanted each of us to see five, and I was like you need to calm down [laughs]"
		Called out each other's differences	"I love how you only make eye contact with me when you're like, 'let's do some more work!'"

*Collabucate prompted or initiated the regulation

Exploring differences between the two groups' motivational states and behavioral expressions. In this subsection, I address **RQ4 part C:** *What differences existed in regulation of motivational states and behavioral expressions between the two groups?* Since I only captured students' motivational states and behavioral expressions, using Collabucate ratings, the percent of off-task talk, and the length of the group meeting, I will focus on the differences in the two groups' *regulation* of motivational states and behavioral expressions.

For the two groups, they shared similar challenge and stimulus event categories except for two. Both groups struggled with unequal participation, but it was qualitatively different. The low self-rated group was challenged by Don's absence during the final group meeting, whereas the high self-rated group was challenged by Linda completing too much of the workload. Also, the high self-rated group experienced differences in group member's standards. Linda held higher standards for their paper submissions. Rick held higher standards for how long discussions should last in group meetings and how much time the group should spend on preparing for their oral presentation.

In the low self-rated group, the main challenge was off-task talk and not using time effectively. In Collabucate, the low self-rated group often rated "lack of commitment and focus" as a challenge. To regulate this challenge, the group would plan to leave by a certain time and "just get this done." When the group did go off topic, usually Jason would change the topic back to the task. At one point, Viola voiced her approval when the group was being productive. She said, "I'm proud of you guys for actually working."

Even with prompting from Collabucate, the group did not regulate towards any new patterns in their off-topic talk. During the last group meeting, we piloted a new group feature for Collabucate. We handed them a worksheet that outlined strategies to decrease off-topic talk as

members of the group rated this as a frequent challenge. During the Collabucate pilot, two of the students disagreed about the group's behavior.

Jason:	*"Has your group used this when we have unproductive discussions about"...No,*
Liz:	*Yea we do*
Jason:	*Not very often, we enjoy our unproductive discussions quite a bit. (laughs to himself)*
Liz:	*It's just hard to be productive in general. It's not like-*
Jason:	*Yeah.*
Liz:	*... these unproductive discussions are not the reasons we're not gonna pass this class.*
Jason:	*Yeah.*

In this exchange, Jason voiced that the group frequently had unproductive discussions. At first, Liz argues otherwise and then voiced her belief that it is hard to be productive. She also expressed a lack of impetus to change the behavior. Within this group, Liz was often the individual to take the group off-task and Jason was usually the one to bring them back to the task. The evidence indicated that Liz's inclination to spark off-task discussions was afforded by her belief that off-task talk was not a hindrance during these projects. At the end of the Collabucate pilot, the group was prompted to create a group plan to overcome the challenge. They wrote down that if the group meetings were to continue, it would have helped them to create a structured to-do list for each group meeting to solve their problem of too much off-task talk.

In the high self-rated group, the frequent off-tasker, Mary, also expressed beliefs *about* off-task talk. When her group received the Collabucate strategy to improve focus and commitment, Mary free wrote, "in order to increase group energy, we sometimes purposefully get off topic to relax and not be so serious. This helps us re-focus and limit continual distractions." Also, after another group member apologized for going on a tangent, she said, "I like these tangents." However, I observed that some of her group members did not share her

preference or beliefs. Linda would target Mary and tell her to "focus." At times, Linda would be visibly frustrated by Mary's off-topic conversation. Linda's requests for the group to focus would work temporarily.

Within the high self-rated group, Rick was a consistent co-regulator and the first turn of many of socially-shared regulation of motivation episodes. These behaviors seemed to be the result of his high value for the task, coupled with a growth mindset (C. Dweck, 2000) for motivating other group members. A growth mindset is a belief that a trait has a potential to change, whereas a fixed mindset is a belief that a trait is innate. In a private conversation with Linda, Rick asked,

Rick:	*How do you mobilize those people [students who don't like the course]?*
Linda:	*I don't know. I don't know for [this course] if it's possible, 'cause they're carrying so much baggage about what [this course] is*
Rick:	*I believe it's possible*

In this exchange, Linda espoused a fixed mindset for motivating other students in this course, whereas, Rick argued that motivating other students is possible (i.e., growth mindset). In theory, these beliefs would dramatically affect how Rick and Linda interact with other students (C. Dweck, 2000, p. 83). For instance, Rick would be expected to have greater attempts to regulate other's motivation.

During his conversation with Linda, Rick continued with a long elaboration on how to motivate others. He says that in a group, individuals will be influenced by the majority because they want to belong to the group. He gave Linda the example of how Brett was very motivated in a co-curricular group they were both shared because all the other people were motivated. Their conversation moved on to how some leaders excel in motivating teams. Then they discussed someone at the school who served as a good model. They said that this leader was motivating

because they were visionary, personable, and able to build support. Overall, Rick insinuated that he has thought much about how to motivate others and was open to learning alternative approaches to motivate group members.

The high self-rated group's most effortful regulation venture was attempting to curtail Linda's share of the group effort. During the first group meeting, the group thanked her for bringing in materials and reading articles about their problem area. When she volunteered to compile the written assignments, the other group members agreed. Halfway through the project, the other group members appeared to become uneasy with the amount of effort Linda was committing. The group started teasing her about it and verifying whether she was satisfied with the workload allocation. Rick had a conversation with her one-on-one advocating that it was not fair that she was completing the majority of the group's effort. Linda pushed back by saying she did not want another group member to carry the burden of combining the group's individual work. Then during the last meeting, Brett, Mary, and Amy completed the Collabucate pilot by themselves. They were assigned a group inclusion strategy. When the Collabucate pilot prompted them to evaluate the allocation of the group's effort, the three group members agreed that Linda was putting forth an unequal share. However, they decided it was not a "problem" and that it was out of their control because they had already "given her sincere outs." Then five minutes later, Mary came up with an idea to overcome the situation; they decided to structure group meetings to include writing up the final product as a group.

Both groups decided the most effective strategy was not to directly address the situation or beliefs, but to restructure group meetings. The low self-rated group decided to make a more structured to-do list to limit off-task talk, whereas the high self-rated group decided to complete the paper write-up during the scheduled time to limit Linda from completing the action by

herself. From observations, other effective strategies in the co-regulation of effort and willingness included joking or teasing about differences between members or violations of norms. For example, a student may loudly say, “Amy is over here shopping” and then laugh. Joking and teasing were effective because students must not only overcome the challenge but maintain a positive social environment. Also, one of the most common strategies, setting an intention for the group meeting (e.g., let’s be productive) was effective because it did not directly call out an individual student. For the performance minded students, it was especially effective to say, “let’s be productive and then we can leave early.” This strategy was effective since it sets an intention and promises the reward of leaving early.

Lastly, one of the most significant effects to their group’s task engagement was the high self-rated group’s decision to meet earlier in the day. During one of their last group meetings, the high self-rated group met during lunch and took an audio recorder with them. By aligning their energy states with the tough work of discussing through a problem, the group successfully persisted at a high level of discussion throughout their meeting. Later, they reflected on their engagement when Amy asked, “can we try to do more of these lunch time sessions?” Mary added, “we were so much more productive.”

In summary, some of the most effective strategies were group meeting structuring, indirectly addressing the challenge, or creating a future intention. Overall, the regulation of motivational states and behavioral expressions were a necessary aspect of completing the group task. Groups must plan out their effort allocation towards the task and between each other. Also, groups and individuals within the group experience a variety of challenges towards their motivational states and behavior that they may regulate individually, co-regulate, or socially share in the regulation. Alternatively, the challenge may not be regulated due to effort costs, the

challenge is not deemed a "problem," or the students think the challenge is out of their control.

Summary of Results

Through the analysis of students' statements and interactions, I characterized a comprehensive anatomy of three domains of motivation targets (e.g., motivational task beliefs, values, and goals). I also characterized how these motivation constructs unfolded as a process within student projects groups by coding for motivation co-construction mechanisms. After characterizing motivation types and motivation co-construction, I explored differences between two extreme cases of project groups for these motivation types and motivation co-construction.

For **RQ 1**, I explained how students co-construct different types of motivation constructs by first having one student externalize a statement related to a motivational belief, value, or goal. Then the group may or may not take-up the first students' motivation related statement. How the group takes up the statement determines whether the group came to a shared agreement, an established agreement, or a lack of group agreement.

RQ 2 concerned students' motivational task beliefs, values, and goals. I characterized sub-types of students' 1) project task or content beliefs or values, 2) student cognition and task strategy beliefs or values, 3) competence perception statements, 4) causal attribution statements, and 5) achievement goal orientation statements and motives. The students monitored and reflected upon these task beliefs, values, and goals, although their primary mode of regulation was to control task beliefs, values, and goals for themselves, their peers, and the group. The students managed these task beliefs, values, and goals using several types of strategies in response to stimulus events (e.g., poor feedback) and motivational challenges (e.g., low competence perceptions). A theme emerged from the data that students negotiate and regulate towards their goal orientation and standards. The two groups differed in their negotiation of task

beliefs, values, and goals as they co-constructed different types of competence perceptions, motives, and achievement goal orientations. For differences in the two group's regulation of these constructs, the most profound difference was that the two groups had different challenges and stimulus events to regulate.

For **RQ 3**, I characterized sub-types of students' beliefs or values about the self, their peers, and the group. Social goal orientation statements emerged as a salient type of motivation construct that aided the characterization of the two group's motivation. Although the occurrence of students regulating their motivational social beliefs, values, and goals was rare, the phenomenon was important to understanding the groups' motivation. Both groups had members who monitored their negative beliefs about their peers, but there were no instances of students controlling for their negative beliefs. For the low self-rated group, they negotiated and regulated their interpersonal attributions, peer costs, and peer beliefs following a peer norm violation (i.e., Don skipping the last meeting). The high self-rated group was different from the other group due to their negotiation of positive group beliefs, a social affiliation orientation, and a social welfare orientation.

To address **RQ 4**, I presented Collabucate data on students' ratings of their motivational states. I found that both groups participated in a high proportion of off-task talk (up to 60% of the talk turns). Both groups engaged in frequent and varied regulation of their motivational states and behavioral expressions. In response to stimulus events (e.g., a test in another course) and motivational challenges (e.g., inattention), the students planned their effort and also monitored, controlled, and reflected upon their states and behavior. The two groups, in general, had similar motivational challenges and stimulus events to control except, however, the high self-rated group's unequal participation was from a group member completing too much of the work,

whereas the low self-rated group struggled with members not completing enough of the work. During the study, both groups were prompted by Collabucate to regulate aspects of their motivational states and behavioral expressions. The low self-rated group decided the challenge, unproductive group behavior, was out of their control and would cost effort yet they planned to implement a group structuring strategy (i.e., structured to-do list) to overcome the challenge. The high self-rated group was prompted by Collabucate to alleviate the unequal participation between members. At first, they decided it was not actually a "problem" and their previous efforts had failed. However, they too eventually decided to implement a group meeting structuring strategy (i.e., complete the paper as a group) to overcome their challenge.

Overall, I elucidated the types of motivation constructs that emerged in two project groups' talk and how these two project groups co-constructed the motivation constructs. In the final chapter, I will provide further summaries and contributions in key areas. I will also discuss the strengths and limitations of the study as well as provide a direction for future research.

CHAPTER 5 DISCUSSION

Engagement in deep learning and collaboration practices requires constructive motivational beliefs, values, goals, and regulation (Järvelä & Järvenoja, 2011; Kempler Rogat et al., 2013). When students do not value the task or their team members, they will minimize their effort and engage in superficial learning strategies. Unfortunately, motivation constructs have not been addressed sufficiently in the collaborative learning literature (Rogat et al., 2013), especially social-motivational constructs. When motivation is explored in the context of collaborative learning, researchers either apply one narrow construct, do not focus on the group (Rogat et al., 2013), or measure motivation through self-report instruments. In this study, I conducted a video observation study to examine which types of motivational beliefs, values, goals, and regulation students expressed in a project-based learning environment, and how these differed in groups who rated their group motivation as high and low.

The purpose of the study was to characterize how student project groups co-constructed and differed in certain types of motivation and motivation regulation constructs. Few studies have comprehensively applied motivation constructs at this breadth to collaborative learning. In fact, there is a paucity of research combining motivation regulation constructs with motivational beliefs. Utilizing a narrow set of constructs has its advantages, but also disadvantages. By utilizing a narrow set of constructs, researchers tend to overapply their available constructs. For example, Hadwin et al. (2018) outlined a few studies that claimed to measure regulation, when in fact, the researcher's definitions were closer aligned with cognitive knowledge construction. By

including both motivational beliefs and motivation regulation concepts, I was able to contribute to the distinction between the two ideas. Also, by using multiple motivation belief, values, and goal constructs, I was required to specify how the theories were distinct and how they overlapped, resulting in an organizing framework (see Figure 6).

The resulting codebook, organizing framework, and the inventory of the types of motivational beliefs, values, and goals will enable future researchers to further disentangle the complexity of motivation in collaborative learning groups. This study contributes to research about the fundamental knowledge and theory of collaborative learning groups' motivational and social processes. By understanding these processes that occur in collaborative learning, future researchers can intentionally select and measure constructs of interest. A key contribution of this study is the resulting codebook with definitions and examples since several of the selected motivation theories have yet to be studied through observation in collaborative learning. An additional advantage of this study is that I was able to directly observe how motivation constructs emerged, sustained, and faded. Specifically, I observed for how students expressed different types of motivational beliefs, values, and goals and how this manifested in their behavior.

Summary and Contributions

The key assertion of this study is that differences in students' motivation during collaborative learning can be explained by achievement motivation theories but with the added complexity of socio-motivational dynamics. Similar to when an individual student works on an individual task, the students working in groups expressed the following motivational beliefs and values: task difficulty, competence perceptions, subjective task value, causal attributions, and identity. For example, in this study, students from both groups stated that the task was easy and

cost time away from studying for other courses. However, collaborative learning, by design, afforded more social interaction. Therefore, the following socio-motivational dynamics played a central role for students' motivation in collaborative learning:

- The co-construction of motivational beliefs, values, and goals
- Students' beliefs and values about themselves, their peers, and the group
- Similarities and differences between group members' goal orientations and standards
- Negotiation and regulation of motivational beliefs, values, goals, states, and behavioral expressions

The co-construction of motivational beliefs, values, and goals. In this study, I followed Rogat and colleagues' (2013) recommendation to examine how shared, group level motivation occurs and develops throughout time. Overall, I found groups build, construct, and deconstruct motivational beliefs, values, and goals akin to knowledge co-construction. To my knowledge, no studies had explored the idea of *motivation co-construction* for motivational beliefs, values, or goals. In the group-level regulation literature, researchers have measured episodes of co-regulation or socially-shared regulation based on types of co-construction mechanisms (Hadwin et al., 2018). In this study, I deconstructed those regulation co-construction mechanisms for the dual aim of increasing inter-rater reliability of codes and cross-purposing them for the co-construction of motivational beliefs, values, and goals. My approach was successful as the final inter-rater agreement was 90%. Also, the co-construction codes had utility for both the regulation constructs and the motivational belief, value, and goal constructs. In the end, applying step-by-step co-construction process to both types of data generated a need to distinguish between co-construction, regulation, and non-regulation. The data fit according to Figure 6, which depicted co-construction mechanisms as having two arms: a regulation arm and a negotiation arm as

defined by characteristics from Alexander (2018). Although this framework was created for motivation co-construction, it is not specific enough to rule out future applications to the co-construction of cognition, metacognition, or emotions.

The outcomes (e.g., shared agreement) of co-construction episodes were beneficial for recognizing patterns within and between student groups. The shared agreements were relatively stable throughout the project period unless the group co-constructed an alternative belief, value, or goal. Students' discussion that resulted in an established agreement or lack of group agreement were driven by an individual within the group. Therefore, these beliefs, values, and goals were less likely to be shared by all members of the group. I included in my analysis of established agreements and lack of group agreements the name of the individual student who activated the episode to identify differences within the group. For example, the low self-rated group came to established agreement during two time points when Liz said they were going to win and Jason said they were not going to win. In this case, the group was assenting to both opinions that vary between the two individuals.

The student groups co-constructed to a *shared agreement* for task difficulty, task costs, group competence perceptions, and a range of motives including to just get the task done, get a certain grade, and put forth a good effort. In addition to co-constructing task-related motivation constructs, the groups co-constructed *social* beliefs, values, and goals. The groups came to shared agreements for social goal orientations and peer and group beliefs, values, and identities. Between the two studied groups, they had salient qualitative differences in the types of achievement motives, social goal orientations, peer identities, interpersonal attributions, and group identities they expressed.

Students' beliefs and values about the self, their peers, and the group. Overall, a contribution of this study was applying social motivation constructs, for example, identity (S. B. Nolen et al., 2015), social-motivational processes, and interpersonal relationships (Wentzel, 1999), which have been found to be important mediators of engagement in other learning environments, to the context of collaborative learning. In doing so, I have identified the types of social motivation constructs that can emerge in collaborative learning and have begun to explore how they unfold. That is not say that identity and peer beliefs have not been studied in collaborative learning, but their application to how the field understands students' *motivation* in collaborative learning is rare. Although it is unsurprising that social motivation constructs emerged in collaborative learning, previous collaborative learning researchers have neglected their inclusion in favor of cognitive motivation theories (e.g., achievement goal orientations). How students understand themselves, their peers, and the group represents a tightly bound system of social motivational beliefs which can, in turn, sway their task-based motivational beliefs, values, and goals. For example, if a student doesn't enjoy working with their group, then this will influence their overall task engagement.

The codes for students' beliefs and values about the self were based on identity theory. S. B. Nolen et al. (2015) defined identity as both the identities assigned to people through their social position and identity as self-understandings people create around what they are learning. In this study, I focused only on students' self-understandings of themselves. These self-narrations influence the practices students take up and the decisions they make (Turner et al., 2014). Through their participation in collaborative discourse, students used their identities to explain their thinking process and decisions. The students talked often about themselves, their histories, values, preferences, labels, and their typical ways of thinking, doing, and being. The

emergence of self-talk was used to justify their cognitive arguments, build relatedness with and gain approval of their group members, and propose their level of engagement with certain activities. For example, Linda's self-understanding as a good writer and a bad public speaker led her to strongly advocate for varying levels of engagement in the group's paper writing and final presentation.

Students' overall identities afforded and constrained students' practice-linked identities (Nasir & Hand, 2008). In this case, practice-linked identities are students' group-linked identities; who one is or whom they are becoming through their participation in their group. After applying the concept of practice-linked identities to this data, I view practice-linked identities as students' self-understanding of their group role. For example, Linda told Rick that she was the "stage manager" of the group and he was the "front man" due to their overall characteristics as introverted and extroverted. Linda assigned this positional identity to Rick that he accepted as valid.

Of the beliefs about peers, interpersonal attribution theory (Juvonen & Weiner, 1993) was especially useful for explaining socio-motivational dynamics between peers. In the low self-rated group, one of the group's largest group motivation problems was when Don decided to skip the last group meeting. This situation prompted the remainder of his group to evaluate the interpersonal attributions for why he violated a behavioral norm. The finding on interpersonal causal attributions was aligned with a theoretical paper by Juvonen and Weiner (1993). Juvonen and Weiner (1993) argued that whether students judge their peers' behaviors as intentional or uncontrollable, decides how they feel about their peers, which in turn, influences how they interact with their peers. This is especially true when a peer's behavior negatively affects another student (i.e., peer costs) or is perceived as not adhering to peer norms (Juvonen & Weiner, 1993).

In summary, peers judge other peer's behavior based on their adherence or violation of peer norms (Bellmore et al., 2004; Hamm et al., 2011) combined with the value and costs of that peer's behavior to themselves. When students violate a norm, especially when it costs them, then their peers are prompted to ascertain whether the violation was due to stable or non-stable, internal or external, and controllable or uncontrollable causes.

The high self-rated group also experienced some negative peer interactions, but their overall task engagement was buffered by positive group interactions leading to a strong group identity. The tension between two students never explicitly appeared during the group's interactions. Instead, the group shared an identity as an exceptionally good group who is supportive and likes each other. Juvonen (2006) might interpret this as the group creating a strong sense of belonging, whereas Johnson and Johnson (2003) would call this a cohesive group. In classroom motivation research for secondary students, a strong sense of belonging can lead to students feeling accepted, respected, and valued which, in turn, has led to higher achievement outcomes (Juvonen, 2006). Johnson and Johnson (2003) theorize that as cohesion in groups rises, increases should occur in group commitment, willingness, productivity, and persistence. In this study, the high self-rated group was more committed, willing, productive, and persistent, but the findings cannot be generalized as they are derived from two case studies.

Similarities and differences between group member's goal orientations and standards. In this study, I started with the 3 x 2 model of achievement goals proposed by Elliot et al. (2011). I was prepared to apply definitions of their constructs to student statements. However, I was unable to confidently determine achievement goal orientations for certain types of students' statements. Therefore, I abandoned classifying achievement goal orientation statements in favor of capturing students' more surface-level motives and then later categorizing

them either to mastery, performance, or an indiscernible orientation.

The students discussed grades as their motive and standard to guide their effort (e.g., high pass). The low self-rated group shared a performance orientation, whereas the high self-rated group had mixed achievement goal orientations. Two students claimed to hold a mastery orientation and believed the other three students "just wanted to get it done." A contribution of this study was learning that students will explicitly voice their individual motives, build group motives, and interpret their peer's behaviors as evidence of certain motives. For example, Rick interpreted Mary's dislike for working outside of protected time to mean she was performance minded.

Social goal orientations emerged as a salient and easily identifiable type of motivation goal. The students expressed their social goals for the group task. Both groups desired social approval from their teachers. The high self-rated group and one member from the low self-rated group held a strong orientation towards social welfare. Social welfare goals are briefly mentioned in social goal orientation literature (Urdan & Maehr, 1995), but have been rediscovered and relabeled as helping-orientated goals in the achievement values literature (Brown, Smith, Thoman, Allen, & Muragishi, 2015; Harackiewicz, Canning, Tibbetts, Priniski, & Hyde, 2016). Some students value academic activities that contribute to society compared to activities that solely serve themselves. In this study, students' social welfare goals affected how they interacted with the task including the types of solutions they proposed to their assigned problem and what sub-topics interested them.

In addition to social goals for the group task, students also held social goals for social practices in the group. How the group functioned and interacted was afforded and constrained by individual and group-level social orientations. Individual students varied in the strength of their

social concern, compliance, responsibility, and approval goal orientations which, in turn, led to different sets of behaviors. For example, Don displayed a lack of desire to adhere to social rules and expectations while also attending meetings late, being absent, and bragging about skipping other courses. An influential social goal in the data set was Ricks' social goal to gain Mary's approval. Rick revealed that this particular social goal inhibited his ability to regulate the group's behavior. At the group level, the individual group members in the high self-rated group co-constructed a shared desire to enhance their sense of belonging to the group (i.e., social affiliation goal). Presumably, that group's social affiliation goal imparted the group's social behaviors including sending each other texts, supporting group member's outside commitments, and asking group members about their past. These social behaviors and others may have increased the enjoyment of the group working together, leading to greater persistence during group meetings.

Negotiation and regulation of motivational beliefs, values, goals, states, and behavioral expressions. Another contribution of this study was distinguishing motivation regulation into three types: 1) regulation of task motivational beliefs, values, and goals, 2) regulation of social motivational beliefs, values, and goals, and 3) regulation of motivational states and behavioral expressions. For each type of motivation regulation, I identified and characterized the types of challenges or stimulus that initiated the students' motivation regulation. Although previous researchers have measured motivation regulatory processes through observation, no one had measured the types of motivation regulation challenges students experience through observation. I combined my observations with students' ratings of motivation challenges in Collabucate that were useful but not sufficient to detail every motivation challenge type. Then I associated each challenge with how the students used regulation processes and

strategies to overcome the challenge. The results are detailed enough to contribute to the development of regulation supports including Collabucate, direct instruction on group motivation, and teacher education. Although the findings are only from two groups, they are detailed enough to be useful and provide a solid foundation for future researchers.

The study resulted in the distinction that negotiation and regulation are co-construction pathways. However, I am still left with more questions. While defining, coding, and analyzing these constructs, I was limited by the field's understanding of regulation in general and the understanding of regulation in groups. Alexander's (2018) distinctions between regulation and skills was beneficial but presented them as a dichotomy; either a student is regulating or they are not. While observing students, I wondered if regulation and skills existed on a continuum. Instead of a students' behavior or statement being regulated or not, was is it *more or less* regulatory? Some constructs were easily labeled as automatic (i.e., skills) or effortful (i.e., regulation), but another set appeared to be in the middle that might suggest that automaticity exists on a continuum. For example, a student may be struggling to keep their group on-task and decides to start the next meeting with the goal statement "let's be super efficient today so we can leave early." In this situation, the strategy was effortful and the student was carrying it out consciously. However, would this statement still be regulatory if two years had passed and the student was in a habit of saying this for every meeting? In that situation, it would be closer to a collaboration skill since it was more automatic. I wonder if skill and regulation exists on a continuum though because of all the situations in between the first time the student uses a strategy and the one hundredth.

However, if it lies on a continuum, then a new question emerges. Where do researchers draw the line between strategy or skills? Future regulation researchers and theorists should

grapple with this question. A second question is whether all talking turns count as conscious, effortful, and purposeful, because talking is conscious, effortful, and purposeful. Researchers may study individual students' behaviors, but unless they are using a think-aloud protocol, the researchers cannot be confident what the student is thinking. In collaborative learning, students are speaking and thinking to themselves. It is known that unconscious thoughts can occur or behavior can emerge without conscious thought. However, is student discourse more intentional than a thought because students had to decide to express their thought out loud? The third question is whether it is even meaningful to distinguish between negotiation and regulation in this type of research. There is not yet sufficient evidence to support the idea that groups function and perform better because they use more regulation strategies instead of effective routinized skills or both. Therefore, future researchers could either choose to continue to distinguish between regulation and skills or they could capture both with the disclaimer that the student behavior or statement was either a skill or regulatory.

Contributions and implications for pharmacy and health professions education. In health care practice, health care professionals must increasingly work in teams. However, several researchers have uncovered underlying and superficial dysfunctions within health care teams (Freeth, 2001). Akin to health care practice, students also struggle to work with each other. Therefore, health professions schools should teach students valuable collaboration skills to use during school and their future health care practice (Berwick & Finkelstein, 2010)

Although this study was not an investigation of how to develop collaboration skills, it does have implications for the instructional content of collaboration skills, design of group tasks, and development of regulation scaffolds. In this study, collaboration skills included how students negotiated and regulated their own, others, and the group's motivational beliefs, values, goals,

states, and behavioral expressions. In other words, I looked at one aspect of collaboration skills; how students motivated themselves and others.

This study represents one possible source of evidence to underly direct instruction on collaboration skills for both students and educators. I have characterized the types of motivation and social processes that occur between a highly and lowly motivated student project group. Both students and educators could be taught how to identify these processes so they may begin to positively influence these processes. For example, student groups may become more collaborative and motivated if they are instructed on psychological safety or achievement goal orientations. In a similar manner, educators, especially small group facilitators, may be able to better co-regulate students' motivation during collaborative learning if they are taught about motivational states, beliefs, values, goals, and behavioral expressions. Theoretically, if educators are knowledgeable about types of student motivation, then educators will improve their ability to identify the source of students' lack of effort or engagement. For instance, if an educator noticed that one student was not participating, then they could ask themselves whether it was due to a low task value, a peer conflict, a work avoidance goal, and more.

Instruction on collaboration skills for students and educators should address the largest pain points for students. From this study and others (Edmunds & Brown, 2010; Houlden et al., 2001; Tipping et al., 1995), it is clear that one of the largest pain points for health professions students in group learning is working with peers who 1) violate peer norms due to reasons that other students attribute to stable, in-control, and internal causes, 2) cost their peers time, effort, or emotions, or 3) collide with each other due to differences in personal values, goals, or standards. In previous studies of medical students in problem-based learning, researchers have called these types of peer interactions "personality conflicts" (Edmunds & Brown, 2010;

Virtanen et al., 1999). In this study, I have further elaborated on this type of engagement between health professions students to include more in-the-moment and malleable mechanisms. I also took a regulation perspective to view peer conflict as motivation challenges that can be monitored, controlled for, and reflected upon. Thus, instruction for students and educators should outline the types of challenges students face, how to control for them, and opportunities to reflect upon peer conflicts.

In addition to insights regarding instruction, the study produced insights for designing the group task. Theorists who study regulation would argue that to develop collaboration skills (i.e., socially shared regulation strategies), the group task much challenge students and grant students control over those challenges (Paris et al., 2001). Theoretically, students will not develop collaboration skills if they are given an easy task or group. In this study, both groups held a shared agreement that the task lacked substantial challenge. Therefore, the lowly motivated group was able to divide and conquer the majority of the work individually. Also, the highly motivated group claimed that their group "was stacked," suggesting that the students believed their group held a high cognitive ability. As expressed in Chapter 4, the highly motivated group varied in their achievement goal orientations, creating opportunities for regulation and, ultimately, improvement in their collaboration skills (i.e., how to motivate others).

In this study, the design of the group task did not appear to afford high task value beliefs for the majority of students in this study. Specifically, several students commented that the course and the group task were not as important as other concurrent courses in the curriculum. Since students' time and effort is limited, educators should evaluate and predict how students will spend their time and effort resources across a curriculum. If educators believe a course is important for the students, but the students do not, then educators could either create high

standards (i.e., not pass/fail) and expectations, isolate the course away from competing courses (e.g., create capstones or intensive time-based blocks), or intervene to foster students' utility value beliefs. For example, Harackiewicz and Priniski (2018) identified several types of classroom-based interventions to foster student interest and utility-value beliefs that could be useful for promoting group motivation within a course.

In addition to designing high value and optimally challenging group tasks in courses, educators should consider school-wide interventions to improve students' collaboration skills. Particularly due to phenomenon observed in this study, schools could reflect on the culture of student cohorts. Health professions students are often embedded in a cohort under competitive conditions. In the United States, several new pharmacy schools have opened, increasing the competition for pharmacist jobs. Therefore, students entering pharmacy school quickly realize that they are in competition with each other for future jobs and residencies. From observing these students, I believe the competitive environment limited psychological safety and social support. In secondary education, positive peer relationships have been shown to have powerful effects on students' motivational and emotional well-being, buffering stress, anxiety, and depression (Wentzel, 2017). Wentzel, Barry, and Caldwell (2004) specifically outlined the following four characteristics of positive peer groups: information is provided concerning what is expected and valued by the group; attempts to achieve these valued outcomes are met with help and instruction; attempts to achieve outcomes can be made in a safe, non-threatening environment; and individuals are made to feel like a valued member of the group. Ideally, a student cohort should support each other by encouraging mastery learning, discussing failures, and making each student feel like a valued member of the cohort. However, in the studied context, I observed evidence for low psychological safety in both groups. On occasion, students chided each other

for putting forth extra effort or displaying a mastery orientation for the observed course. Of particular interest was how Rick decided not to regulate the group towards a mastery orientation for fear of Mary's social approval. In secondary education, researchers have described how popular children reward social compliance to peer norms with their social approval (Cillessen & Rose, 2005; Sandstrom, 2011), but this dynamic has not been discussed previously in health professions education. Schools could take an active role in promoting positive peer relationships and creating cultures that are conducive for both students' learning and wellbeing.

There is currently a burgeoning set of tools and studies developing web-based group regulation scaffolds. Collabucate is one of these tools among several others (Järvelä et al., 2015). The purpose of these tools is to make student groups aware of group challenges, prompt regulation processes, and explicitly instruct students on how and when to use collaborative regulation strategies. The results of this study will be directly applicable to designing the next iteration of Collabucate and other similar web-based scaffolds. Group regulation scaffold designers can take the most frequent types of challenges and add them to the list of available challenges in their tools. Then students will choose challenges that more closely represent their experience and researchers will be able to collect a larger data set of types of challenges students' report according to a more robust list of challenges. Also, designers can adapt their strategies to the types of strategies observed for in this study. As a result, student groups will receive strategies from group regulation scaffolds that are more aligned with their reported challenges and have been known to work with the two groups in this study. Although these challenges and strategies are derived from evidence of two groups, they are a step ahead of the current lack of literature.

Limitations

Although using a wide breadth of theories has advantages, there are also limitations. By using a large number of constructs, I may have limited the focus and depth of each construct. The resulting picture of the two groups' motivation is complex, yet this may be closer to reality than if the study only resulted in one to two key findings. Students' motivation in collaborative learning may be determined by a multitude of interactions between the student, their peers, the task, the facilitator, their internal states, external factors, and more.

Even though Collabucate was necessary to collect in-the-moment perceptions of students' group challenges, the use of a regulation scaffold is not benign. By prompting students to identify challenges and create plans to regulate, the scaffold is providing support for group regulation that is not present in many current classrooms. Also, the Collabucate data was self-report that can be subject to certain types of biases, such as social desirability and recall bias.

Similar to other observational studies of collaborative learning, I was unable to determine students' hidden perceptions about each situation. For example, a student may nod their head in agreement with their peers, but in their head, they disagree with their peers that frustrates them and, ultimately, constrains their task engagement. Future researchers should consider the use of post-stimulus interviews that ask students to watch the videos with the researcher and comment what there were thinking at the time.

Strengths

Few studies have used this breadth of motivation theories to study collaborative learning. By utilizing different perspectives and ideas, I was able to create a holistic picture of group learning motivation drivers, challenges, and processes. Using multiple theories provides a deeper, broader analysis and decreases alternative hypotheses for why phenomenon occurred

(Banik, 1993; Lewis & Grimes, 1999). Also, using just one motivational construct can blind the researcher to valuable insights.

Ultimately, the Collabucate data was beneficial for triangulating what the coders observed in the videos. The video data only contained what students expressed to each other verbally and non-verbally, whereas the Collabucate data revealed clues, some more explicit than others, as to the students' hidden perceptions and unexpressed intentions. Similar to other studies utilizing log data from regulation scaffolds (Malmberg et al., 2015; Panadero et al., 2015), triangulating the data with learner beliefs and intentions aided the measurement of group motivation challenge episodes and motivation regulation strategies (Hadwin et al., 2018). This approach decreased the number of false positive measurements for regulation constructs, increasing measurement specificity. Overall, the use of the regulation scaffold was value-added for answering the research questions. It was impossible to look at differences between groups that rated their motivation low compared to high without asking students to rate their groups. Also, both groups were exposed to the intervention, so any differences observed are above and beyond the intervention. The study results maintain meaningful insights when understood in the context of student groups' utilizing a regulation scaffold.

Student absences are generally categorized as a limitation or even an exclusion criteria (Isohätälä et al., 2017; Rogat & Adams-Wiggins, 2015) in group learning studies. However, student absences were considered beneficial for observation as they were a realistic challenge that student groups often regulate or fail to regulate. Also, student absences created a naturally occurring benefit. As context is foregrounded in situative motivation research, researchers purposefully conduct their observations across contexts (S. B. Nolen et al., 2015). For example, S. B. Nolen et al. (2011) studied preservice teacher's motivational beliefs across their transition

from school to practice. In this study, I had the advantage of observing how the two groups changed across different sets of individuals. Although I was unable to witness these changes for each student, I did observe how groups operated without three of the four students in the low self-rated group and three of the five students in high self-rated group. As elucidated in the study results, student absences contributed to claims about the group's regulation and negotiation as well as affording the expression of peer beliefs and values.

Although the small number of students and groups involved in the analysis limited generalizability, microgenetic methods (Chinn & Sherin, 2015) are only feasibly possible with small sample sizes. The advantage of microgenetic methods is the sheer number of observations and opportunity to observe step-by-step student learning (Chinn & Sherin, 2015), or in this case, step-by-step motivation dynamics. The findings of this study yielded valuable insights similar to landmark articles in the field that used case studies of group learning (Dillenbourg, 1999; Roschelle & Teasley, 1995). Although it was beyond the scope of this study, including additional groups and analysis to further elaborate on group motivation constructs could promote generalizability for various populations.

Directions for Future Research

In this study, I have characterized several types of motivation constructs for future researchers to further explore and understand. As collaborative learning relies more on social processes than an individual student working on individual tasks, researchers should continue to examine and capture motivational processes that account for these social processes. Specifically, researchers should continue to explore how groups co-construct, negotiate, and regulate their effort and motivational beliefs, values, and goals by studying these research questions with greater numbers of students and in other contexts. Further studies of student motivation in

problem-based learning in clinical topics may be especially relevant and useful for health professions education.

When future researchers study these constructs, they could build off the codebook and methodological approach. I used Collabucate, a mobile technology to explicitly teach students group based learning strategies, to capture in-the-moment student perceptions of their challenges and level of motivation. The Collabucate data was necessary to triangulate interpretations from the video observations. To capture evidence of students' intentions and perceptions, other approaches include stimulus recall interviews (Näykki et al., 2014), experience-sampling method (Csikszentmihalyi & Larson, 2014), or diaries. Also, future researchers could triangulate students' expression of motivational beliefs, values, and goals with available self-report tools either pre- or post-observation period. For example, since achievement goal orientations were difficult to interpret, this study would have benefited from students completing an achievement goal questionnaire.

While this study was not focused on the technology, future research should examine how technology scaffolds can be best designed to support students' motivation in collaborative learning. Results from this study may be used to redesign Collabucate and similar group awareness tools and scaffolds (Järvelä et al., 2015). Specifically, results can inform what types of motivation challenges are provided for students select and what types of strategies students are prompted to employ in technology scaffolds. Modifying the app to promote students' motivation regulation, could be a critical step toward promoting collaborative skills in one domain (i.e., motivation). In addition, *Collabucate* collects data on two additional domains (i.e., cognition and emotion). Exploring how cognitive and emotional processes interact with motivational processes would be a valuable contribution to the collaborative learning literature.

Much remains to be understood regarding how the identified motivation constructs relate to one another. Studies investigating the relationships between motivation constructs have been conducted in the individual student motivation literature, but are not available for collaborative learning. In addition, future researchers could also study the links between motivation constructs, group practices, academic performance, and collaboration skill development. In many ways, this study represents an accumulation of previous motivation studies and, in others, represents a first step towards understanding group-level motivation in collaborative learning. There is still much work to be done to identify what constructs, supports, and process are most important and influential for student outcomes. However, given the importance of creating collaborative and knowledgeable health care practitioners, I believe this type of future research will be critical to the health care system.

Conclusion

This paper provides a comprehensive exploration of the types of motivational beliefs, values, goals, and regulation that occurs during collaborative learning. This study was a necessary first step for surveying the possible social and motivational factors that either accelerate or interrupt students' learning in groups. In this study of two student groups, the students shared similarities and differences in constructs that cut across several motivational theories. One motivation construct is incapable of fully illustrating how and why students engage in group practices in the moment and across time.

Motivational and social dynamics should be supported by scaffolds, direct instruction, tasks, and teachers so more groups will engage in behaviors that foster the development of collaboration skills and deep learning. By students engaging in deep learning, they will retain more knowledge and be readily prepared to engage in health care practices. Also, when health

professions students learn collaboration skills, they will be better prepared to lead health care teams effectively and efficiently, thereby improving patient care.

APPENDIX: CHANGES MADE TO OVERALL FRAMEWORK

In Figure 12, I depict the differences between the initial concept map (Figure 1) and the resulting concept map (Figure 5). The colors in the figure correspond to headings in Table 28. In Table 28, I elaborate on changes to the previous framework and justifications.

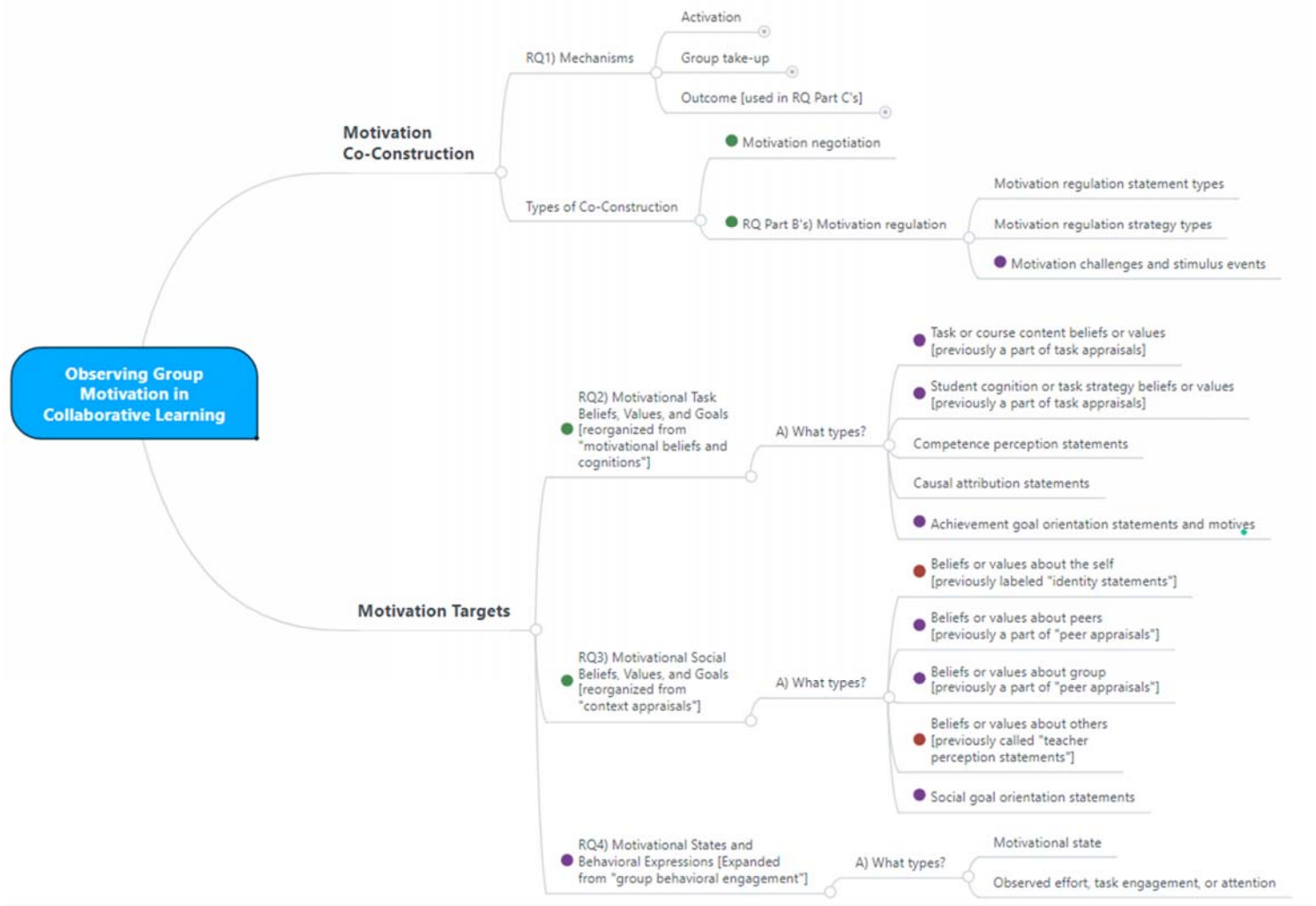

Figure 12. Changes made to the original concept map and organizing framework.
Note. The colors correspond to the following table.

Table 28

Changes Made to Previous Organizing Framework

Previous Model	Change to Previous Model	Justification
Construct Additions or Expansions		
Task appraisal statements	Task appraisals divided into 1) student cognition or task strategy beliefs or values and 2) task or course content beliefs or values	Previous research accounted for task or course beliefs and values as this research is between an individual student and individual task. However, in collaborative learning, the students also expressed beliefs and values about each other's cognition (e.g., solution idea) and task strategy (e.g., splitting up the work).
n/a	Added "Social Goal Orientation Statements" under Motivational Social Beliefs, Values, and Goals	Social goal orientations were salient and readily identifiable in the data set. Their addition creates a more comprehensive model and allowed for a distinction between achievement goal orientations.
Peer appraisal statements	Peer appraisal statements divided into 1) beliefs or values about peers and 2) beliefs or values about the group	Previous research accounted for beliefs in student relationships. However, in collaborative learning, the students also expressed beliefs and values about the group as a whole.
Group behavioral engagement (e.g., on-task or off-task)	Motivational States and Behavioral Expressions	Frequent and salient regulation of motivational states
Motivation challenges	Motivation challenges and stimulus events	In this data set, students not only regulated motivation challenges, but also stimulus events. Stimulus events included task demands or positive events.

Changes in the Relationships Between the Constructs		
Motivation regulation as a *target* of co-construction	Motivation regulation as a *type* of co-construction along with motivation negotiation	This is to rectify a mistake in the previous model. Previous authors have already written about how regulation is a co-construction process, not something that is co-constructed. Also, previous authors, including Sinatra 2018, had already outlined criteria for distinguishing between regulation processes and more unintentional processes.
Motivational beliefs and cognitions included identity statements and not task appraisals Context appraisals included task, teacher, and peer appraisals.	• Motivational beliefs and cognitions category changed to "Motivational task beliefs, values, and goals" to account for any type of task-related construct. Task appraisals moved under this category. • Context appraisals category changed to "Motivational social beliefs, values, and goals" to account for any social-related construct. Identity statements moved under this category.	• "Motivational task beliefs, values, and goals" has been used previously by a theories literature review from Eccles et al. 2002 • The distinction between task-related and social-related constructs improves clarity. Also, the task-related constructs and the social-related constructs were observed to have more tightly bound relationships with each other. • Identity was moved to the social category as identity is socially-constructed and established in reference to other people. For example, "I am extroverted" really implies that "I am extroverted in reference to those who are not extroverted."
Other Construct Name Changes		
Identity statements and teacher perceptions	Changed to "beliefs or values about the self"	Created consistency with the following closely related constructs: beliefs or values about peers, beliefs or values about the group, and beliefs or values about self.
Teacher perceptions	Changed to "beliefs or values about others"	

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